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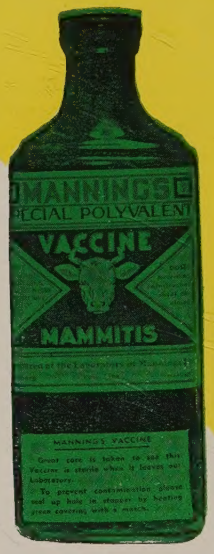

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Fighting the Porina Grass Caterpillar

Certain Farm Practices Offer Chance Of Control

— By —

A. F. GREENALL,

Instructor in Agriculture, Balclutha.

Grass land attacked by Porina caterpillar, showing the bare patches.

EACH year for the past seven or eight years attacks by the subterranean grass caterpillar, Porina, in South Otago have been increasing in extent and severity, until they have now reached alarming proportions in certain localities.

The Porina moth makes its first appearance in early October, but is not directly harmful to pastures. It is the caterpillar, which burrows into the subsoil and comes up to feed on plant foliage, which causes the damage during the winter. In severe cases the ground becomes honeycombed with holes, and the grass becomes severely defoliated and is frequently eaten out altogether. Sometimes a whole face or even a complete paddock may be so denuded as to resemble a ploughed field. The sward never recovers, but becomes clothed ultimately with weeds.

Severe damage is done in various parts of the country by the Porina grass grub. Observations in South Otago suggest that the adoption of certain farm practices—although their efficacy has not been universally proved—shows promise of success and offers a chance of control where other methods have failed.

Direct control by means of insecticides, etc., is out of the question because of cost, and the various methods of pasture management adopted by farmers in the districts concerned have not met with any great success in minimising attacks by Porina.

Promise of Success

The war demands special attention to the task of maintaining or increasing primary production in New Zealand. Attacks by Porina very considerably reduce farm production, not only in South Otago, but in other southern districts. Investigations into the problem are being undertaken by officers of Government Departments, but they are yet in the initial stage and cannot hope to yield immediate results.

Observations carried out in South Otago have pointed to possible success following the adoption of certain farm practices which, although their efficacy

has not been universally proved, show promise of results and offer a chance of control where other methods have failed.

Briefly, the following suggestions are based on the comparative immunity, under South Otago conditions, of cocksfoot, Montgomery red clover, and crested dogstail to attack by Porina larvae, and on methods of establishing cocksfoot which appear to meet with good success on the type of land which is most prone to attack.

Reactions of Porina

Certain characteristics or reactions of Porina are taken into consideration namely:—

(1) Porina larvae feed almost entirely on surface leafage.
(2) Soil consolidation restricts larval activity.
(3) Vigorous plant growth reduces attack.
(4) Porina larvae rarely, if ever, attack a pasture in its first year and not very often after five years.
(5) Flooding pastures not only destroys Porina larvae, but increases the vigour of the pasture plants.
(6) Lax grazing rather than close grazing reduces the damage by Porina.
(7) Certified ryegrass is less prone to attack of Porina and recovers better after Porina infestation than uncertified perennial ryegrass.
(8) Topdressing in the autumn after Porina attack with ammoniated superphosphate results in a much better recovery than would otherwise be experienced.

Sowing the Grass

On farms where Porina attack is, or has been, prevalent, pasture mixtures should be sown down on a firm, fine seed-bed. This ensures quick establishment of grasses and clovers, and the consolidation reduces the degree of damage by Porina. In this connection sowing down in the spring on a disced surface after a swede crop, or in February-March on a disced surface after an early rape crop, is recommended. Discing provides a fine surface tilth and retains stock droppings in the surface soil, where it can be readily used by the young pasture.

Although there is some evidence that lime and/or topdressing predisposes to grub attack, liming with 1 ton of carbonate of lime per acre and sowing with 2 cwt. of reverted superphosphate is to be recommended, as the resultant increased fertility greatly assists recovery of the pasture after grub attack, and lime and manure are essential in the south for any programme of pasture improvement.

A view of the Balclutha district showing in the foreground some of the rolling country susceptible to attack by Porina.

Mixture to Use

The grass mixture used should be similar to the following:—

	Per acre.
Certified Plains, Akaroa or C.23 Cocksfoot	12 lb.
Certified commercial Italian ryegrass	10 lb.
Certified commercial perennial ryegrass	5 lb.
Crested dogstail	1½ lb.
Certified white clover	2 lb.
Certified Montgomery red clover	2 lb.

Provided the country is not too steep, the cocksfoot should be drilled in 7-inch rows mixed with 2 cwt. of reverted superphosphate, the weight of the coulters being usually sufficient to give the seed the required depth. The advantages of drilling cocksfoot with the manure are that a much quicker establishment is secured and the young cocksfoot plants secure a good root hold thus preventing them being eaten out by the crown when the pasture is grazed by sheep.

The remainder of the grasses and clovers should be broadcast, rolled, and very lightly harrowed. The object is to establish a dominant cocksfoot-red clover pasture with sufficient Italian ryegrass to give a good bite of long feed in the first year, and with sufficient perennial ryegrass to give a better density than is provided by a pasture of cocksfoot alone. If too much perennial ryegrass is included it will tend to reduce greatly the density of cocksfoot.

Stock Management

Stock management for the first year or so is probably the major factor governing the success of the cocksfoot pasture. Close grazing should be absolutely avoided. If possible, graze lightly with dry cattle or dry sheep, and if ewes must be used, remove while there is still three inches or so of growth left, and give occasional spells. If this pasture could be closed up for hay in its first year it would greatly encourage cocksfoot growth. In subsequent years close grazing should always be avoided. A topdressing with 2 cwt. of superphosphate per acre should be given each year in March or April.

Should a severe attack of Porina be experienced, ploughing and resowing reduce soil consolidation and are thus conducive to further attack. The best results have been obtained from harrowing early in the spring and broadcasting a seed mixture similar to that described with 2 cwt, of superphosphate before the start of dry weather.

Where available, irrigation should be resorted to, and, if used correctly, can either prevent Porina attack or greatly minimise the extent of the attack once it has appeared.

The establishment of cocksfoot-Montgomery red clover pastures, their successful maintenance and utilisation, and their management—not only to do stock well, but to do the pasture well—appears to be one of the most likely methods of overcoming extensive damage by Porina.

Bloat Can Be Reduced !

You Can Minimise Heavy Losses By Following Pasture Management

C. R. TAYLOR, Fields Instructor, Whakatane.

TO the average dairy farmer of the Eastern Bay of Plenty whose farm is located on one or another of the more fertile soil types such as are to be found in the districts represented by the Rangitaiki Plains, Opouriao Valley, Kutarere, and the Opotiki Flats, there is probably a no more anxious period in the whole twelve months than during the early spring (September and October) when trouble from bloat is so freely experienced.

Heavy Losses

For many years the annual losses from bloat have been considerable, and farmers who have had no experience of this condition in dairy cows can have little idea of the financial loss and acute anxiety often suffered by many of their less fortunate colleagues. To the majority of farmers whose cattle are liable to bloat, the early spring months are a most anxious period because of the rapidity of the onset of the condition and the not infrequent urgent need for drastic action.

Hence, bloat is to be feared even by the stoutest heart, and it is due to the full recognition of this fact that the following comments are made in the hope that the future may see at least a considerable reduction in the incidence of this trouble.

Clover Blamed

It is generally accepted by farmers with experience of bloat that excessive clover growth, especially white clover, in the pastures during the early spring months is chiefly responsible for this condition in dairy cows and to a lesser extent in other cattle beasts. Certainly this contention appears to be well founded in the Eastern Bay of Plenty, but at the same time it must be recognised that bloating can and does occur under circumstances where clover by no means predominates in a sward.

Heavy losses are suffered annually by many dairy farmers through bloat during the early spring months. The author contends that bloat can definitely be reduced—and frequently eliminated—by carrying out the procedure outlined in this article, and that many practical farmers have demonstrated its possibilities.

Bloating has been known to occur in cattle when grazing pastures which were mainly ryegrass in composition, but it was usually found that such pastures were grown quickly with the assistance of some form of forcing or stimulating manure. Consequently, they were unduly sappy and lacking in fibre, thus bringing their chemical and physical condition more into line with young clover growth. Generally, however, a grassy pasture which has grown slowly without forcing over several of the winter months will be found free from any bloating tendency.

It is therefore evident that every endeavour should be made to ensure that several good, grassy paddocks are available for early spring feeding where bloat is known to occur.

Farm Management

It may be asked, how is it possible to obtain a grassy pasture at a season in the year when the natural tendency of certain localities appears to be for the production of clovers. Actually, it is not a question of there being a tendency to a natural clover dominance at all, but rather it is a matter of modification in general farm management.

Almost any pasture grown under reasonably fertile conditions is capable of being made either grassy or clovery at will, provided the principle involved is well understood. Unfortunately this principle is not as generally understood by the farming community as it should be, and consequently many farmers find themselves compelled to accept a situation they know to be to their detriment because of their inability to bring about a change that would react to their advantage.

First, it is necessary to understand some of the characteristics and requirements of the two pasture species —ryegrass and white clover—which are mainly represented in good swards at the season when bloat is chiefly prominent, for without this knowledge it is impossible to see how and why present farm practices are responsible for most of the bloat that is experienced.

Ryegrass

Ryegrass is probably our most valuable grass, and it pays a handsome dividend in return for liberal treatment. It begins to make growth in the late autumn, and continues to do so throughout the winter and spring if managed well by manurial treatment and proper grazing. Few other permanent pasture species will tolerate low winter temperatures, and accordingly it is on this one species that the brunt of winter-grazing falls while all other species are more or less dormant.

By spring, the ryegrass has undergone such a gruelling under the usual methods of management that its power of recovery on the advent of conditions favouring growth is so seriously impaired that it frequently takes many weeks to get into its stride again. In the meantime, white clover is making the best of its opportunities. Finally, ryegrass likes a consolidated, moist

soil and a *reasonable* amount of *consistent* grazing.

White Clover

White clover is a sun and air-loving plant, and must have plenty of room in which to develop fully. Hence, many weak pastures on good land are dominantly white clover. Serious overshading by associated pasture species has a detrimental effect on white clover growth, and it is for this reason that it is possible to change a pasture from a clovery to a grassy one and *vice versa* almost at will.

Unlike ryegrass, however, white clover is more or less dormant during the cold winter months. Consequently, it is not nearly so severely punished by hard winter-grazing, the result being a rapid spring growth unless otherwise controlled. On the other hand, it is similar to ryegrass in that it likes a fertile and moist soil. Cold, waterlogged conditions, however, it will not tolerate in any circumstances.

Chief Factor Responsible

These remarks show that the practice of hard winter-grazing of pastures in certain localities is actually the factor most responsible for the bloating of dairy cows during the early spring. Ryegrass in particular—but other grass species as well to some extent—are so severely punished in the winter months that they cannot possibly afford effective competition (control) to the spring growth of white clover, and the outcome is a vitally unbalanced diet of sappy, bloat-producing herbage for several weeks.

Where farmers have wisely made provision for feeding their early-calving cows by shutting up a number of paddocks some weeks or months ahead there is considerable evidence to show that no trouble, while their neighbours who have hard winter-grazed every field on their farms have experienced much trouble. It should, therefore be the aim of every farmer whose cattle are liable to bloat to have a number of grassy paddocks always available for grazing in the spring.

To Secure Grassy Pastures

To secure good, grassy pastures (approximately 70 per cent. grass species and 30 per cent. clover species) for feeding to stock at the critical time in the spring it is necessary to take a number of paddocks with ryegrass reasonably well represented in them (preferably about one-third of the farm, although a smaller area will do) and shut them up towards the end of May after having applied a suitable topdressing, such as superphosphate or basic slag in the autumn.

This would allow about three months of growth, during which time the grasses would not only have greatly increased their root development and consequently their ability to produce foliage, but would also have grown sufficiently high to shade the white clover effectively and so materially

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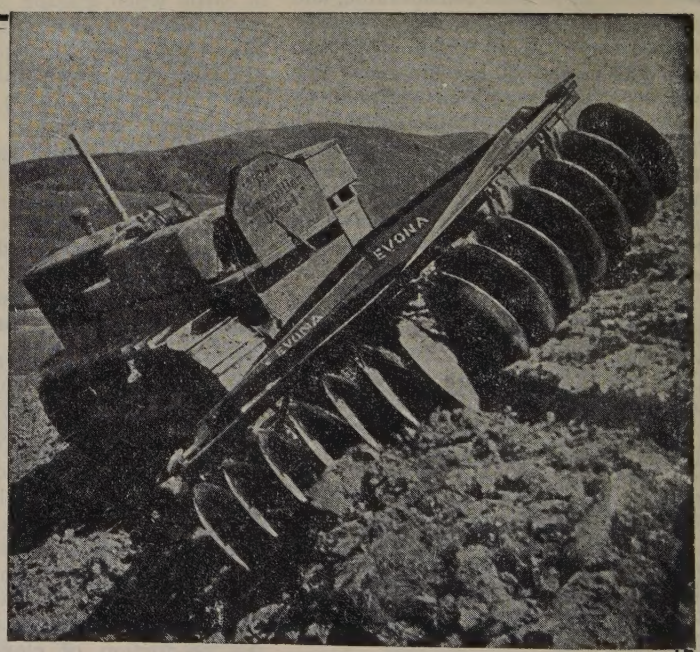

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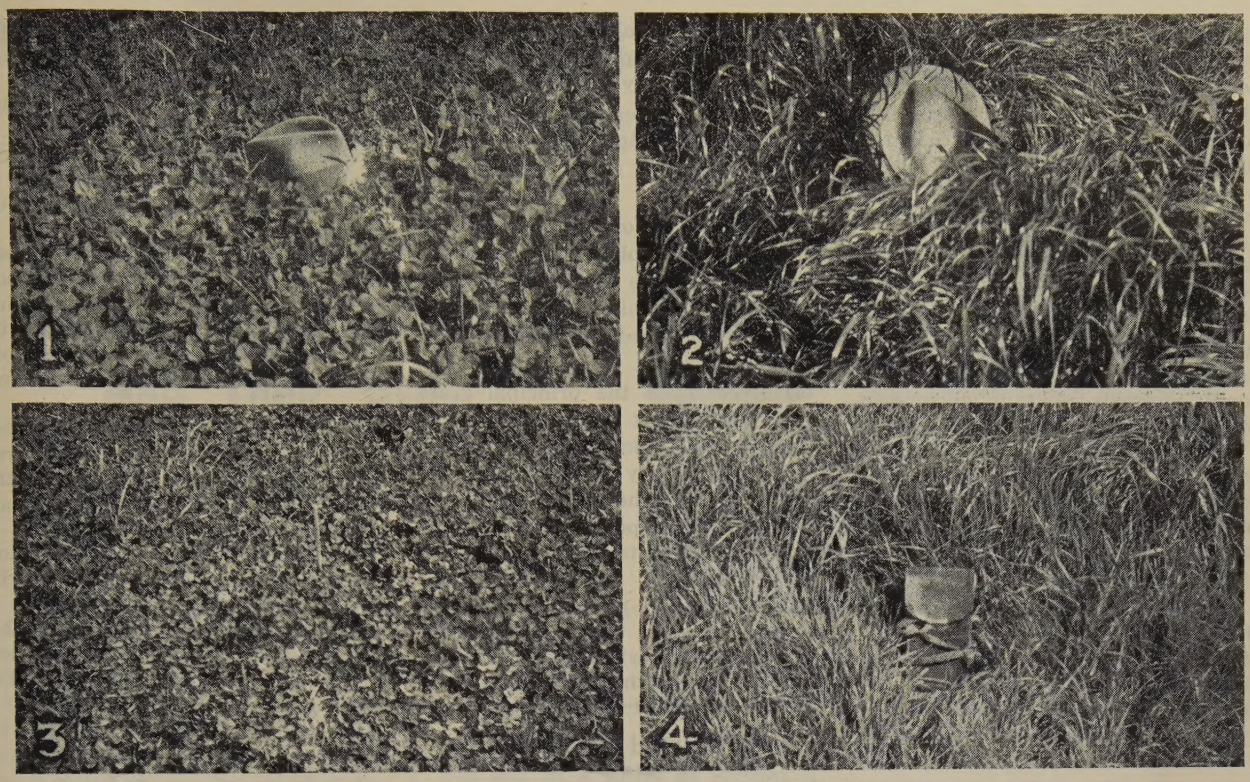

Fig. 1.—A section of a severe bloat-producing pasture in the Whakatane district photographed on 17/10/39. The field was hard-grazed all winter, resulting in a great reduction in the spring vigour of the ryegrass in the sward. The outcome was an abnormal growth of sappy white clover, the strength of which is clearly indicated in the size of the leaves. Note the preponderance of clover to grass growth, resulting in a dangerous, unbalanced diet for stock.

Fig. 2.—Another section of pasture which was non-bloat-producing photographed on the same day as Fig. 1, and in the same district. This pasture was shut up for more than two months during the winter, thus allowing the ryegrass and other grass species to get well away into growth and so control the white clover by a smothering action.

Fig. 3.—A portion of a bloat-producing pasture in the Opotiki district with a history similar to that indicated under Fig. 1. Note the phenomenal amount of white clover in this sward and the small quantity of grass growth. Apart from the question of bloat, such a pasture is essentially low-producing because of the unbalanced nature of its components.

Fig. 4.—A non-bloating pasture of well-hardened ryegrass, timothy, etc., photographed in the Opotiki district on the same day as Fig. 3. As in Fig. 2, the dangerous flush of white clover has been well held in check by the over-shading influence of its vigorous competitors. This field is one of a number which received a good autumn topdressing and was shut up from the end of May until required in the early spring.

control its development. If the winter season happens to be conducive to growth it would be quite permissible to graze off the winter-spelled pastures rapidly to about 4 inches and then shut them up again. On the other hand, if growth is slow they should on no account be grazed until required in the spring.

It will be evident that if such a programme were carried into effect an abundant supply of non-sappy and non-bloating herbage would be available when it is required, and so would be avoided (at least in a large measure) one of the greatest sources of financial loss and anxiety associated with dairy farming in many parts of the Eastern Bay of Plenty.

Effect of Manuring

Manuring in itself can be a factor in intensifying the ill-effects of bloat. In fact, the practice of applying dressings in late winter should not be continued where bloating troubles occur. Such dressings merely intensify growth in the early spring, whereas early autumn dressings assist in maturing the growth on spelled fields.

But what of the difficulty of wintering stock when one-third of the farm is not available for grazing from the end of May to early September? The solution is the provision of more supplementary winter feed on the one hand, and the earlier start of feeding-out on the other. Surely this is not an insuperable hurdle when the advantages are weighed in the balance against the disadvantages, which involve heavy losses of choice stock, low production of the balance of the herd due to the drastic rationing of pastures, in many cases lack of topdressing caused by fear of bloat, rapid deterioration of pastures, culminating in heavy subsequent expenditure, and finally, acute mental anxiety to the farmer.

Pasture Wastage

The provision of more winter feed is surely a small price to pay for the avoidance of much of the trouble associated with not doing so, especially when one recalls the vast wastage of

pasture that all too frequently takes place during the average late spring and summer months. In many cases fields of too great an area are a prolific source of pasture wastage due to the impossibility of grazing them efficiently. Avoid this loss by careful and proper management, and for the most part there will be no shortage of supplementary winter feed or difficulty about reserving a number of good pastures for spring grazing.

Where bloat is actually occurring and giving much trouble, the mower should be freely used in advance of the herd. Thus, if stock are restricted to partially-wilted material much of the spring worries will be reduced. Although this entails extra work at an already busy season, the savings in stock will more than outweigh losses in other directions.

Summary

Summarised, the position regarding farm management in relation to the incidence of bloat is as follows:—

(1). Bloat is usually associated with quickly-grown, sappy herbage produced under highly fertile conditions.

(2) White clover is the pasture species chiefly responsible for bloat, but not necessarily so, as explained in this article.

(3) The growth of white clover can be definitely controlled by competition with other pasture species. Without this competition white clover gets completely out of hand during the early spring months.

(4) Ryegrass is the principal grass species which most effectively controls white clover if allowed to do so. Because of its ability to grow throughout the winter, when most other permanent pasture species are more or less dormant, it takes the brunt of winter-grazing.

(5) Hard winter-grazing of ryegrass severely limits its power of recovery in the spring, and white clover is therefore presented with its opportunity to dominate a sward for several weeks and sometimes months. Bloat follows this dominance.

(6) Grassy pastures, as opposed to clovery pastures, can be secured only by giving the ryegrass a chance to grow and overshadow the white clover. This necessitates the early shutting up of several fields until required in the spring.

(7) The shutting up of several pastures for two or three months reduces the area available for winter-grazing. This difficulty is overcome by saving and generally providing more supplementary feed and beginning to feed out earlier.

(8) Bloat can definitely be reduced, and frequently eliminated, by carrying out the procedure outlined in this article; many practical farmers have demonstrated its possibilities.

(9) Practice early autumn top-dressing and avoid spring manuring except on hay and ensilage fields.

(10) Where bloat is causing trouble, mow the fields in advance of the herd so that they can be fed on wilted material.

Varieties of Garden and Field Peas Immune to Pea-mosaic

E. E. CHAMBERLAIN, Mycologist, Plant Diseases Division,
Department of Scientific and Industrial Research.

PEA-MOSAIC is a virus disease common on garden and field peas throughout New Zealand, and in certain districts it causes serious losses. An account of this disease giving its host-range, symptom, economic significance, and control has already appeared.*

Fortunately, not all varieties of peas are susceptible, some remaining free from disease even when growing adjacent to varieties showing a high percentage of infection. As the use of such immune varieties affords a convenient method of control, the more commonly grown garden and field pea varieties have been tested for susceptibility. Details of these tests have been recorded elsewhere**, the following list being a summary of the results.

SUSCEPTIBLE VARIETIES.

Garden Pea.

Admiral Beatty, Alderman, Benefactor, Blue Bantam, Cooper's Coronation, Day's Early Sunrise, Dwarf Alderman, Early Market, Giant Stride, Gladiator, Gradus, Great Crop, Greenfeast, Laxton's Progress, Peter Pan, Pioneer, Pride of the Market, Prince of Wales, Senator, Stratagem, Thomas Laxton, Yorkshire Hero.

Field Pea.

Arthur, Austrian Winter, Blue Prussian, Canadian Beauty, Chancellor, Early Blue, French Serpettes, Green Brunswick, Harrison's Glory, Jumboka, Late Partridge, Lima, Mansholt, Partridge, Unica, Victoria, Victoria Danzig, White Elephant, White Ivory, Zelka.

IMMUNE VARIETIES.

Garden Pea.

Autocrat, Daisy, English Wonder, Greenfeast Rogue, Hundredfold, Little Marvel, Lord Chancellor, Lord Chancellor (Tare-leaf), Onward, Royal Salute, William Massey, Witham Wonder.

Field Pea.

Black-eyed Susan, Mackay.

* Chamberlain, E. E. 1937.—"New Zealand Journal of Agriculture," Vol. 54, pp. 129-38.
** ———, 1939.—"New Zealand Journal of Science and Technology," Vol. 21, pp. 178A-183A.

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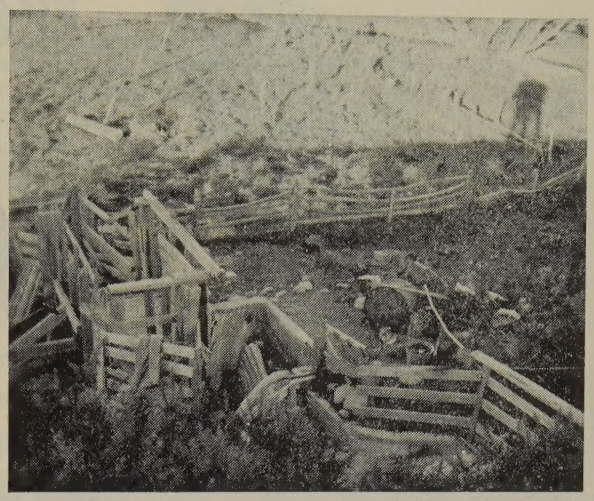
Design and Construction of Sheep Dipping Baths

Various Types of Baths And Their Uses

— By —

J. E. DUNCAN.

Wool Instructor, Livestock Division, Wellington.



The kind of dip NOT to have on your property.

IT is to the advantage of every sheep farmer to possess his own dip, because then he can do his dipping when it suits him, use the brand of dip which he prefers, and generally have every chance of doing the job properly. Where he has to depend on the use of a neighbour's dip or one at a saleyard he has none of these advantages, and, in addition to having to accept conditions as he finds them, is frequently put to the trouble of droving his sheep perhaps a considerable distance over dusty roads.

The man who decides to build has to weigh up the pros and cons of the various types of dips from which he may choose, and it will be as well to mention these briefly with some indication of their strong and weak points. The following list includes practically every type of bath used for dipping sheep:—

(1) The Swim-through.
(2) The Divided Swim or U Bath.
(3) The Pot or Round Bath.
(4) The Island or Ring Bath.
(5) The Small Tank.
(6) Shower Dip.
(7) Steel Baths for unstable soil.
(8) Cage dipping apparatus.
(9) Canvas bag.

Of these various types of baths the last four are not in use in New Zealand, and only very brief mention will be made of them.

This was to have been the third and last of a series of articles on sheep dipping, but because of the length of this last section it has been found necessary to hold over part of it for publication next month. The diagrams and specifications of the various types of dips will therefore appear in the May issue of the "Journal."

(6) The Shower Dip

This type of bath is used to a fair extent in some parts of Australia. It consists essentially of a shed with a watertight floor, and a flat roof in the form of a shallow galvanised iron trough perforated with a great number of small holes. The sheep are run into the structure and packed fairly close. The dip is pumped to the roof, and comes down on the sheep like rain, and in some of the improved types is also sprayed up from the floor. It drains back through strainers and sumps, and is pumped back to the roof again. The sheep are kept in from three to seven minutes until thoroughly wet. Its advantages are its relatively easy construction, quick operation (250 sheep can be dipped in three to seven minutes), and the absence of any rough treatment of the sheep. Hence, it would be good for weak sheep or ewes heavy in lamb. At present, however, this type does not comply with the provisions of the New Zealand Stock Act, which states that sheep must be "immersed" in the dip.

(7) Steel Baths

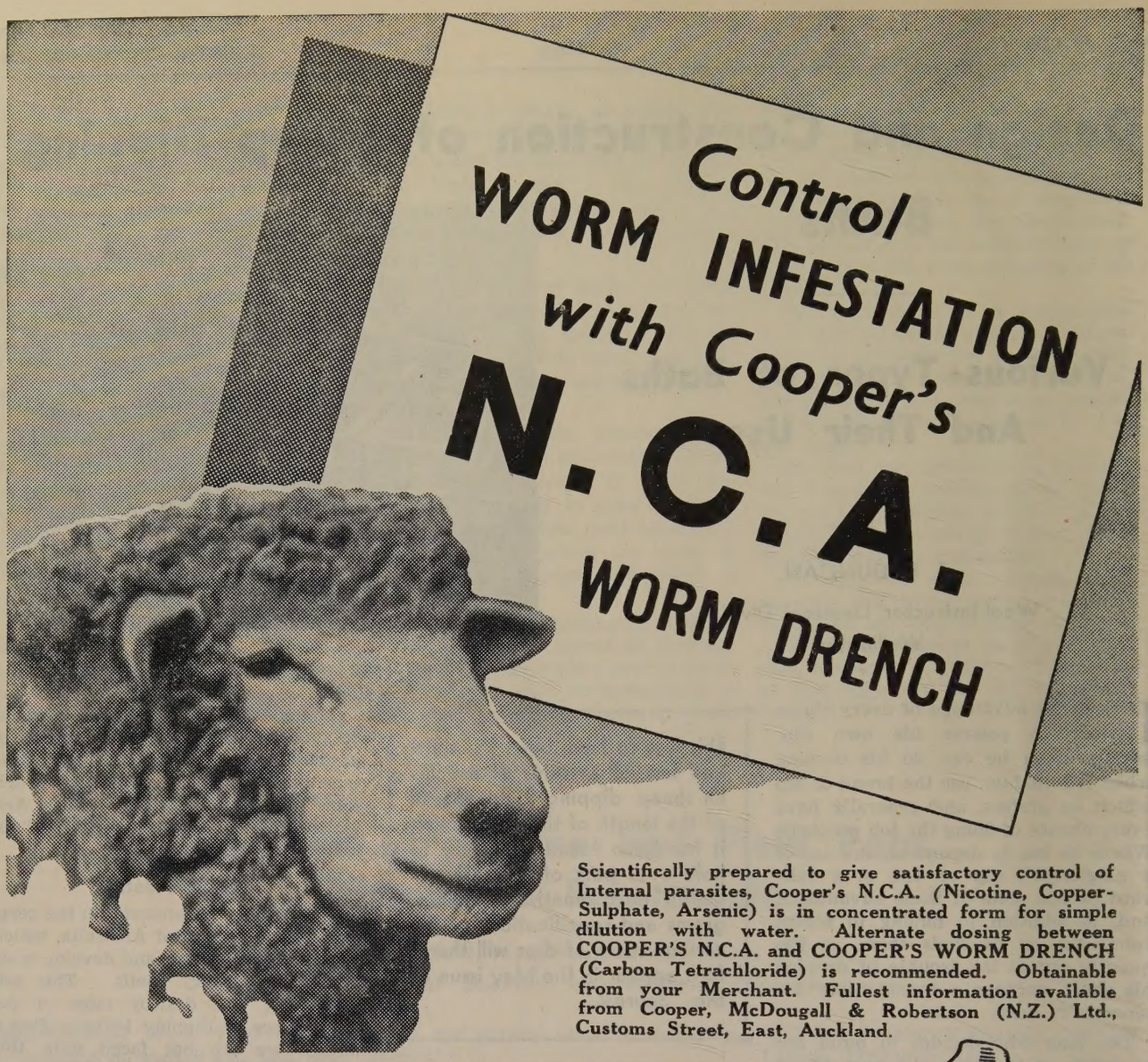
Steel baths are necessary on the deep, black soils of parts of Australia, which swell in wet weather and develop wide cracks during dry spells. This soil movement will destroy most of the other types of dipping baths. Fortunately, we are not faced with this problem in New Zealand, but we have an analogous case in that for many years past baths in certain known earthquake areas on the East Coast of the North Island have been mostly built of wood to resist earthquake shocks.

(8) The Cage Bath

The cage bath was at one time in fairly wide use in Great Britain, and its appearance and method of operation are clearly indicated in Fig. 2 in the first article of this series. It is still in use in both Great Britain and U.S.A. to a limited extent.

(9) Canvas Bag

The use of a canvas bag also hails from North America, where on some of the farms perhaps only a dozen sheep are kept and the expense of a



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proper dip is not warranted. The sheep are dipped singly in the bag by manual labour, but the process, although possibly economical, must be a slow and back-breaking job.

Now to come nearer home and deal with those dips which are in popular use in this country.

(1) The Swim-through or Long Swim Bath (See fig. 1)

This consists essentially of a long narrow trough, which may be built of any material suited for the purpose. (Various building materials for baths will be mentioned later.) The longest type may be anything up to 70 ft., or

Fig. 1.—A typical swim-through dip. Note the twin mixing tanks on the right, which are a very useful adjunct, ensuring the dipping fluid being kept at the correct level and the correct strength.

even more. It has a steeply-sloping entrance, and a less steeply-sloping exit. The usual dimensions (apart from length) for this type of bath are approximately:—

Depth about 5 ft.; width at top approximately 24 inches; width at bottom 8 to 10 inches.

Advantages

(a) This type of bath with a "walk-in" entrance means less rough treatment for the sheep than any of the other types.

(b) Where it is of sufficient length the sheep are bound to get sufficient immersion due to the time it takes them to swim through it.

(c) A well-constructed bath of this type can be worked with a minimum of strenuous labour. It is eminently suited for large flocks.

Disadvantages

(a) The first cost for a long bath is rather high.

(b) A long bath will hold a large quantity of wash, and when this gets too low for further dipping there is still a fair volume left in the bath which cannot be used.

(c) Although the labour required for its use is not strenuous, a long bath will require more men to work it compared with other types.

A variation of the swim-through bath is the shorter type of the same general design—perhaps only 20 ft. long. This type, having a lower first cost and being cheaper to fill, is of use with medium-sized flocks provided it is fitted with a check-gate of some type at the exit to hold the sheep back. This is absolutely essential; otherwise they will not be in the wash a sufficient length of time.

(2) The Divided Swim or U BATH

The method of construction of this type of bath will be clear from Fig. 2. It is really a long-swim doubled back on itself.

Advantages

(a) The main advantage is that for a given length of swim nearly half the building material is saved as compared

Fig. 2.—The U bath, or divided swim.

with an orthodox swim-through of the same length, as the central partition need only be of light timber construction.

(b) It gives some of the advantages of the long-swim to a man with a small flock, while keeping first cost and cost of replenishing low and reducing the labour required.

Disadvantages

(a) Sometimes a certain amount of difficulty is experienced in getting the sheep to turn the corner. This must be wide enough for big sheep, and lambs and hoggets are prone to double back the wrong way.

(b) If only one man is working the bath he may have difficulty in getting round from one side to the other in time to save a sheep in difficulties.

(3) The Pot or Round Bath and its Modifications

This is by far the most common type of dip in use in New Zealand, and is suited for both small and medium-sized flocks. As will be seen from Fig. 3, the round variety resembles a gigantic flower-pot in shape,

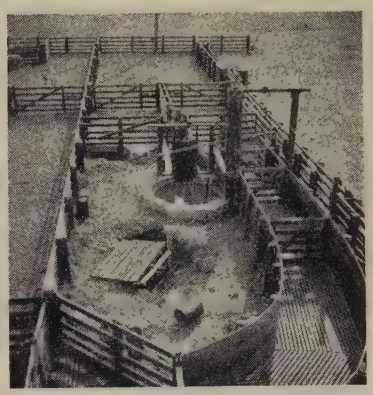


Fig. 3.—A good example of a pot bath. Note also the curved race and the covered sump for harmless disposal of used dip.

although it may vary considerably in size, having a capacity of anything from 4 to 10 grown sheep. The variation is largely in the diameter of the pot, the depth being roughly constant at about 4 ft. 6 in. to 5 ft. 6 in.

Various methods (which will be described later) are used for getting sheep into the bath, and it is necessary to have a check gate in the exit to keep the sheep in for the proper time. In practice, it has been found most satisfactory to have a wide exit so that the sheep can leave the wash two abreast if necessary. This allows weak sheep to take a rest after leaving the wash without holding up the others behind them, and, in addition, the bath can be emptied more quickly as soon as the check gate is opened.

For ease in construction or for use with a tip-platform the round shape may be replaced with a square or oblong (having the extreme corners rounded), and these types are quite satisfactory if properly designed.

Advantages

(a) Low first cost.

(b) Holds relatively little wash—low replenishing costs.

(c) Because of its peculiar tapering shape dipping can continue until the wash is fairly low.

(d) A good type can be worked by a single man.

Disadvantages

(a) If made in concrete (the usual material), the round mould may present some difficulties to the average farmer, but the shape may be modified as suggested above.

(b) It is unsuited for dipping very large flocks because of its slowness compared with swim-through baths.

(c) The sheep are subject to more rough treatment in entering the bath than in the case of a swim-through bath with walk-in entrance.

(4) The Island or Ring Bath

This might be described as either a modified pot, or as a modified swim bath, for looking at it one way it is really a pot bath with an "island" in the middle of it, or alternatively it can be called a circular swim-through. As shown in Fig. 4, the actual bath is

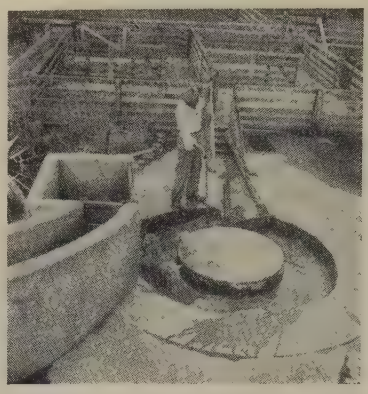


Fig. 4.—The island or ring bath.

similar to the swim-through type, the only difference being that it is a complete circle instead of straight. This particular type of bath seems to have originated in New Zealand, and quite a number are to be found in parts of the North Island, especially Hawke's Bay.

Advantages

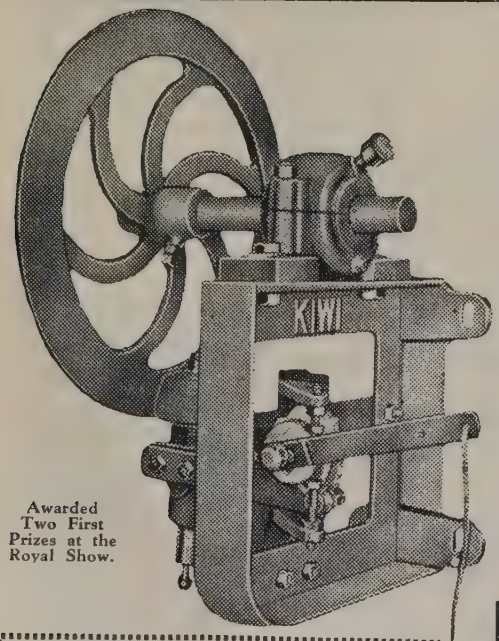
(a) The sheep may be made to swim round and round for any desired length of time; yet this is accomplished in a bath of relatively moderate first cost and not holding a great deal of wash. It is claimed, in fact, to be cheaper in construction and use than any other bath of the same capacity.

(b) Like the plain pot bath, it requires a minimum of labour to work it, although in this respect it cannot compare with the pot bath fitted with a tip-platform—a labour-saving device which cannot be used with the ring bath.

(c) Sheep do not readily get on their backs, and go out of the exit in more orderly fashion compared with the pot bath.

Disadvantages

(a) The shape of this dip makes it rather complicated to build in concrete, and unless the farmer is fairly skilled



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in this method of construction he will require the services of a builder.

(b) It is difficult to avoid the danger of sheep bumping themselves against the island when being put into the bath. If it is widened very much at this point there is a danger that the sheep will be able to turn round.

(c) Sheep can be made to swim round and round the pot bath without the necessity for any island, and dipping can continue until the wash is lower than is the case with the island.

(d) If sheep do get on their backs it is harder to right them than in the case of the pot bath.

(5) The Small Tank Bath

This is shown in Fig. 5, from which its construction is plain. There is hardly need to tabulate advantages and disadvantages of this bath, because

Fig. 5.—A small bath suitable for very small flocks or stud sheep. Note the size in comparison with the shovel.

it is really intended for handling only small flocks of sheep. There is no object in making it large, as it would then be better replaced by one of the other types.

In its smallness lies its special advantage for the man who has only a few sheep and wishes to possess his own bath—for example, a small stud breeder. Its first cost is low, and comparatively little wash is required to fill it. The check gate is really its essential feature, for without this it is difficult to keep sheep in long enough merely by checking them with a crutch.

Choice of a Suitable Type Dip

The choice of the type of bath to be built is influenced by a number of factors. Putting these briefly without attempting to arrange them in any special order of importance:—

(1) Number of sheep to be dipped.

(2) Labour supply available for operation of bath. For example, the tip-platform pot bath probably requires least labour of all, but it is much slower for a larger mob of sheep than the long swim bath.

(3) First cost and cost of filling. It is obviously uneconomic to fill a large bath with wash to dip 500 sheep.

(4) Question of space available on a suitable site.

(5) Sometimes the question of materials available. For example, it would be much easier to build a short swim than a pot bath from timber.

(6) Personal preferences or prejudices. Fashion in the district.

It should be amply clear from the foregoing that there is no "ideal" type of dip, as no one type can fulfil all possible requirements, and in the final analysis the farmer must make his own decision after considering all the foregoing factors and any others that apply to his particular case.

The Best Site

It is relatively seldom that the bath is quite unattached. It is usually included in the layout of the drafting yards. Sometimes it is built directly alongside the shearing shed, which is used for filling it. This method has advantages in that it saves the expense of separate yards and crush pens, the sheep are cooler just before entering the dip, and after being on the grating floor their feet will be cleaner and will foul the wash very little.

Occasionally the bath is even covered by a lean-to roof from the side of the shed, so that dipping can be finished and the sheep kept under cover even if unexpected rain comes on. It also affords protection during the heat of the day. Where a bath is a separate unit—for example, on a large station where it may be centrally situated away from the main yards and woolshed—it will have to have its own set of holding yards and crush- and draining-pens attached.

Points to be Considered

(a) A good, dependable water supply is essential.

(b) The site should have good natural drainage. It is an advantage to have it on an elevation, because not only do sheep yard better uphill, but it will mean that a reasonably short drainpipe can be used for emptying the dip.

(c) Soil giving a firm foundation is required. Avoid, especially, peaty soils, which are notorious for shrinking and expanding.

(d) The site must naturally be large enough for the proposed **type** of bath. For example, a pot bath requires less space than a swim-through.

(e) Availability of shelter for the dipped sheep.

General Layout of Bath Draining Pen

The arrangement of the various units comprising the dipping plant can be discussed only in very general terms, because there are no hard and fast rules.

If the dip is situated alongside the drafting yards the usual practice is to so arrange it that these can be used for feeding the sheep forward to the bath. Where the dip is a separate unit it will, of course, be necessary for it to have its own set of yards, but these need not be complicated, as a holding yard, a single or double crush pen to force the sheep up to the dip, and a couple of draining pens are all that are really essential. As long as the

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various units are in the proper *sequence* their actual arrangement does not matter much, except that wherever possible it is best to have the sheep moving uphill towards the dip.

It is claimed by some that sheep enter the dip best with the sun at their backs, and by others that a curved or a hog-back race leading up to it gives the best results. Unfortunately, there is no very convincing evidence on any of these points, as equally strong advocates can be found for all of them. The idea of a turntable or a circular crush pen for getting sheep into the bath will be mentioned later. This when used in conjunction with a tip-platform dip, is well suited for medium-sized or even large flocks, and saves a good deal of labour.

Crush Pens and Race

For any but the smallest dips it is very desirable to have two crush pens so that they feed into a common race —one being refilled while the other is being emptied, thus making the process continuous. Whether these crush pens form part of the drafting yards or whether they are built specially for the dip, their mode of construction is the same.

They are usually of post and rail construction, with the rails on the inside and the central dividing fence railed on *both* sides to present a smooth surface to the sheep. Close boarding is preferable, but not essential. In length these pens vary a good deal, and may be anything from 15 to 30 ft. or more, but the width is usually 4 to 5 ft.—certainly not more than 5 ft. or one man will have difficulty in forcing the sheep forward.

It is an advantage for a crush pen to have a batten floor (similar to the gratings in a woolshed) raised off the ground and either made to lift up in sections, or have adequate space for raking out below. These gratings will get rid of much of the dirt from the sheep's feet, and will prevent it finding its way into the dip. It is important to have the battens running lengthways along the crush (and the same in the race if they are used there), for if they run crossways the sheep will be able to dig their toes in and resist being moved much more effectively.

Dimensions Of Race

The race connecting the crush with any but the walk-in or slip-in entrance should be from 3 ft. to 4 ft. wide and preferably close boarded. If it is too narrow it will take too long for the sheep to pass through, and if too wide one man will have difficulty in stopping the sheep dodging back past him when he is attempting to drive them forward.

Where the walk-in or slip-in type entrance is used the race is the same width as a drafting race—that is, about 16 inches—just wide enough for the sheep to pass in single file. Curved races and hog-back races will be mentioned presently. Sometimes the floor of

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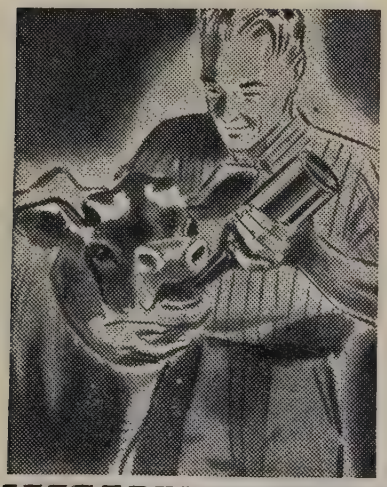

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the race is also of battens, but more frequently of wood or concrete.

It might be mentioned again here that, where possible, it is best to have crush and race running up a slight incline. In the construction of the crush and race it will often be found possible to utilise swing gates as sweeps to force the sheep ahead and save some labour.

Methods of Construction of the Bath

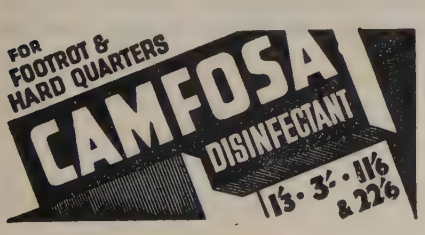
Although it is hardly within the scope of this article to describe the actual construction in any detail, it will be as well to mention briefly the different materials used:—

(a) Concrete.
(b) Brick.
(c) Masonry.
(d) Riveted or bolted steel sections.
(e) Timber.

(a) Concrete is a most adaptable material, and, when properly reinforced is the most suitable of all for dipping baths. It is cheap (where metal and sand are closely available), requires only semi-skilled labour for building, gets stronger as it ages (no other building material does this), and, because of its permanence, maintenance is practically nil. It is suitable for all types of baths, and can be moulded to the most intricate shapes by a skilled man.

(b) and (c) Neither brick nor masonry is widely used in New Zealand. They require no moulds, but it is doubtful if they are much easier to lay than concrete. They have not the same strength and permanence as reinforced concrete, which in most cases could advantageously replace them.

(d) This type is probably never used in New Zealand. A representative of one of the leading dip manufacturing firms says that on his travels during the last 30 years he has not yet encountered a bath of this type in New Zealand.



(e) In certain cases, due to transport difficulties, timber is the only material available. If good, durable timber is used, well preservatised, thoroughly tarred inside, and well surrounded on the outside by a layer of puddled clay, it makes quite a satisfactory dipping bath. Naturally, it is better suited to a bath composed mainly of flat surfaces, such as the swim type. One important point in connection with the use of a timber bath is to keep it full of water when not in use. This prevents shrinkage and caving in of the walls.

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the ten months, May, 1939, to February, 1940, has been compiled by the Livestock Division :—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat-Export Slaughterhouses—						
Auckland	125,870	582,294	279,815	168,653	971,896	206,212
Poverty Bay-Hawke's Bay	31,721	61,029	524,929	228,976	1,227,804	20,363
Taranaki-Manawatu ..	65,499	229,361	340,657	206,376	1,201,038	120,904
Wairarapa-Wellington ..	23,528	18,691	335,701	157,466	830,997	24,347
Totals	246,618	891,375	1,481,102	761,471	4,231,235	371,826
Abattoirs	99,129	32,317	398,282	208,603	63,719	95,195
North Island Totals ..	345,747	923,692	1,879,384	970,074	4,294,954	467,021
South Island						
Meat-Export Slaughterhouses—						
Nelson-Marlborough ..	732	9,773	19,210	5,821	100,191	7,276
Canterbury	9,515	42,619	235,526	174,811	1,407,251	28,061
Otago-Southland ..	5,032	40,345	115,618	85,494	1,576,010	4,084
Totals	15,279	92,737	370,354	266,126	3,083,452	39,421
Abattoirs	46,199	11,569	226,819	112,047	37,397	23,478
South Island Totals ..	61,478	104,306	597,173	378,173	3,120,849	62,899
Dominion						
Meat-expt. Slaughterhouses	261,897	984,112	1,851,456	1,027,597	7,314,687	411,247
Abattoirs	145,328	43,886	625,101	320,650	101,116	118,673
Grand Totals	407,225	1,027,998	2,476,557	1,348,247	7,415,803	529,920
Same period 1938-39— Meat-export Slaughterhouses and abattoirs ..	397,787	990,559	2,480,316	1,269,954	7,431,793	674,705
Same period 1937-38— Meat-export Slaughterhouses and abattoirs ..	397,601	1,040,801	2,084,836	1,017,588	7,056,123	756,927

Slaughterings of Pigs

The 95,767 pigs killed during February were distributed in weight ranges as follows :

Under 60 lb.	260
61-100 lb.	15,580
101-120 lb.	20,431
121-160 lb.	44,009
161-180 lb.	11,079
Over 180 lb.	3,219
Sundries	1,189

The killings are fewer by approximately 16,000 carcasses than in February of last year, but in actual weight of meat killed the decrease is approximately only 4,000 average carcasses.

The number of pigs killed at less than 100 lb. weight is satisfactory, and if reasonable caution is maintained for the rest of the killing season there will be little danger of a surplus of porker for export.

Pork gradings are 91.5 per cent. prime and 8.5 per cent. second quality, and baconer gradings are 68 per cent. prime 1, 24.3 per cent. prime 2, and 7.7 per cent. second quality.

In the different weight ranges of baconers the grading is as follows :

101-120 lb. .. 86.2%, 10.1%, 3.7% of P.1, P.2, and 2nd quality respectively.
121-160 lb. .. 65.7%, 27.0%, 7.3% of P.1, P.2 and 2nd quality respectively.
161-180 lb. .. 45.5%, 38.4%, 16.1% of P.1, P.2, and 2nd quality respectively.

Half-yearly Fertiliser Returns—1939

THE following returns from July to December, 1939, have been compiled by the Inspector of Fertilisers, Fields Division, Department of Agriculture, from figures furnished by courtesy of the Comptroller of Customs.

Fertiliser	Origin.	July Tons.	Aug. Tons.	Sept. Tons.	Quarter Tons.	Oct. Tons.	Nov. Tons.	Dec. Tons.	Quarter Tons.	Half-yearly Return. Tons.
Phosphates—										
Rock	Gilbert and Ellice	1,501	10,705	9,794	22,000	10,165	..	5,881	16,046	38,046
	Nauru	39,195	10,853	27,872	77,920	31,911	33,912	23,272	89,095	167,015
Total		..	..	..	..	..	..	..	..	*205,061
Slag	United Kingdom	..	80	50	130	1,000	100	..	1,100	1,230
	Belgium	50	..	100	150	..	..	..	..	150
Total		..	..	..	..	..	..	..	..	1,380
Guano	New Caledonia	..	312	..	312	..	1,125	755	1,880	2,192
	Seychelles	..	..	..	..	..	7,628	..	7,628	7,628
	United Kingdom	..	20	..	20	..	..	..	..	20
Total		..	..	..	..	..	..	..	..	9,840
Bonechar and Bonedust	Australia	..	300	..	300	..	102	100	202	502
Other Phosphates	Belgium	1	..	50	51	..	10	..	10	61
Total Phosphates		..	..	..	..	..	..	..	..	216,844
Potash—										
Kainit	France	182	..	..	182	..	..	300	300	482
	Germany	16	..	45	61	..	..	..	..	61
Total		..	..	..	..	..	..	..	..	543
Muriate	Germany	30	50	..	80	..	..	..	..	80
	France	..	10	..	10	..	..	..	..	10
Total		..	..	..	..	..	..	..	..	90
Sulphate	Germany	65	255	92	412	12	..	..	12	424
	France	25	55	..	80	10	..	40	50	130
Total		..	..	..	..	..	..	..	..	554
Other Potash	France	325	1,345	400	2,070	950	..	25	975	3,045
	Germany	925	1,305	605	2,835	30	..	..	30	2,865
Total		..	..	..	..	..	..	..	..	5,910
Total Potash		..	..	..	..	..	..	..	..	7,097
Nitrates—										
Sulphate of Ammonia	United Kingdom	770	637	410	1,817	580	175	..	755	2,572
Nitrate of Soda	Chile	200	315	290	805	210	1	..	211	1,016
Total Nitrates		..	..	..	..	..	..	..	..	3,588
Other Fertilisers	Australia	..	..	..	..	..	50	..	50	50
	India	..	2	..	2	..	..	..	..	2
	Norway	..	1	..	1	..	..	..	..	1
	U.S.A.	..	..	..	..	..	9	..	9	9
	United Kingdom	111	65	8	184	40	18	..	58	242
Total Miscellaneous		..	..	..	..	..	..	..	..	304
Sulphate of Iron	Australia	..	3	1	4	..	8	..	8	12
Totals		43,396	26,313	39,717	109,426	44,908	43,138	30,373	118,419	227,845

* Equal to about 400,000 tons of superphosphate.

Novel System of Rotational Grazing

A general view of Mr. Stevens' farm. The grazing density in the flush of the season approximates 30 cows per acre.

How a North Auckland Farmer Has Reduced Capital and Labour Charges on Dairy Farm

P. S. SYME, Instructor in Agriculture, Warkworth.

A NOTEWORTHY feature in the development of the dairying industry in New Zealand has been the gradual evolution of a specialised and highly-intensive system of farming. It has been increasingly realised that the secret of success depends not so much on broad acres lightly stocked as on the selection of a suitable, small, economically-sized unit, the production of which is developed to nearly the maximum possible capacity.

Provided the climate is suitable, good management will work wonders on very unpromising soils, and, with the knowledge now available, it is often a simple matter to make three blades of grass grow where one blade grew before. Developed in this way, each acre counts as three.

The great measure of success which has frequently followed this system has resulted in a tendency for intensification to become a fetish. There is obviously a limit to the per-acre capital which can economically be invested, and beyond this any increase will inevitably result in a constantly-diminishing return on each additional pound so expended.

This account of successful results in the management of an individual farm breaks interesting new ground. An astounding and basic feature of the management is that the amount of feed available at any time decides the number of cows-in-milk carried. Comparatively extensive buying and selling of cows at a productive age takes place. This feature is important, one deduction from it being that the success of the system of management would tend to decline as it becomes general—a multitude of buyers at one stage and a multitude of sellers at another would tend so to disorganise the dairy cow market as to make unsatisfactory the type of management under consideration.

Just when the limit will be reached will obviously depend on individual conditions, but there can be little doubt that many farmers are today becoming over-capitalised. Once saturation point has been reached, the investment of any additional capital is not likely to be justified by any increased production so obtained.

Break from Tradition

Thinking along these lines, Mr. T. G. R. Stevens, of Kaukapakapa, decided to break from tradition and to evolve a system which would be designed to suit his own particular conditions—one which, while taking full advantage of the various methods available for increasing production, would at the same time reduce labour charges and avoid over-capitalisation. To this end he has consistently employed the acid test: "Will it pay?" Just how far Mr. Stevens has reached towards his objective will be gathered from the following description.

Altogether, the farm provides an effective grazing area of about 60 acres. The area is long and narrow, so that it is by no means convenient to handle. The land itself is of low natural fertility, and when first taken over

carried a very poor type of pasture, much of which was self-sown. Some idea of its original productive capacity may be gained from the fact that the first year of operations produced only 45 lb. of butterfat per acre. This obviously left much room for improvement.

Basis of System

Basically, the system on which Mr. Stevens operates depends on efficient topdressing and close subdivision with carefully-controlled grazing. So far, it is *more or less orthodox. Where it does* differ from most dairy farms is in the grazing system practised and the fact that *no supplimentary feed whatever is provided.* Instead of controlling growth by topping or the making of hay or silage, Mr. Stevens relies entirely on the stock. *The amount of feed available at any time decides the number of cows carried.*

This obviously means that Mr. Stevens is frequently on the market as a buyer or a seller. He is a firm believer in testing, and when feed is scarce, he culls out his poorest producers. He has at no time experienced any difficulty either in disposing of surplus stock or in obtaining replenishments, and, contrary to what some might expect from a system which necessarily entails frequent buying in, he has had little or no trouble with disease. This Mr. Stevens attributes largely to the fact that his pastures carry a very diverse sward, and that he does not unduly force up production.

The farm is mainly low-lying, heavy clay, and pugging of the race used to be a serious problem in wet weather. This has been overcome by constructing a concrete walk. Although only 18 inches wide, it has proved highly effective, the cows walking leisurely down in single file.

Importance of Intensive Subdivision

In operating his system, Mr. Stevens lays great stress on the efficiency of his subdivision. In all, there are 28 paddocks of almost exactly the same area—slightly over two acres. Of these, 20 are used as day paddocks and eight as night paddocks, and, as the stock change every grazing, this gives intervals of nineteen and seven days respectively between grazings on these areas.

Under the existing conditions this seems to provide quite effective control of the grass, and although there is some tendency for the pastures to become rank in the flush of the season, they are quickly eaten down at a later stage before the grass becomes too wiry. One grazing leaves each field in turn uniformly trimmed down, and each in turn is permitted sufficient time for recovery before the next grazing. In this way, each individual

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plant is allowed full opportunity to develop its leaf surface, and the weakening which results from the shrinking of the root system consequent to defoliation is reduced to a minimum.

This combination of a large leaf area and the maintenance of a well-developed root system is undoubtedly an important factor as affecting the rate of growth, and probably to some extent explains why Mr. Stevens succeeds so well in wintering his cows without any form of supplementary feed whatever. Needless to say, the importance of a supply of good water in every field has not been overlooked.

A good water supply in every field is absolutely necessary for the success of this system. Mr. Stevens has designed a very simple and efficient type of concrete trough, the high pressure available compensating for the small size. Note how the ball cock is protected from stock.

Replacement Costs Are Low

As will be seen from the following figures, the control and utilisation of growth by the periodic adjusting of stock to feed has not in actual practice proved a very expensive annual charge, and, taking everything into consideration, it is probably very much lower than that normally incurred for replacements on the average farm.

Year ended 31st March.	Bought in.	Sold.	Debit in balance of trade (including sale of Calves).
1936-37	17 cows 1 bull	14 cows 1 bull	£11 2 3
1937-38	17 cows 1 bull	13 cows 1 bull	£30 11 9
1938-39	19 cows 1 bull	18 cows 1 bull	£6 7 6
1939-40	10 cows 1 bull	None yet sold to date	Anticipates a profit.

Under this system about 60 *profit-making* cows are carried in the flush of the season, and in winter the number is reduced to about 45, those retained being animals which have produced best under test. About 15 selected calves are reared each year, but these are sold after weaning. Mr. Stevens claims that specialised farms can produce heifers more cheaply than he can rear them, and that, to make the most of his land, every mouth must belong to a high producer, and that his most profitable product is milk. Cows represent his most economic form of stock.

Advantages of System

The advantages of this system are obvious, and Mr. Stevens claims that any drawbacks are actually more apparent than real. In view of the fact that not a single horse is kept, that there are no implements whatever on the farm, and that, as no hay or silage is made, there is no feeding-out, it will be readily appreciated that there is considerable economy of both capital and labour. In addition, the short grazing period reduces pugging to a minimum, and with no feeding-out, the turf remains unbroken even in the wet winter months, although the soil is naturally a low-lying, heavy clay. This no doubt explains why the most ubiquitous buttercup presents no problem on this farm.

Judged by its actual performance the system pays. The production per acre in 1927-28 was 65 lb. butterfat In 1930-31 it was 87.7 lb. per acre. By 1937-38 production had risen to 224.6 lb. per acre, and the prospects are that this year will be better still.

It is not suggested that these figures are in any way remarkable, but, as the pasture is improving every year, there is obviously considerable scope for improvement before the limit is reached, and this limit does not yet appear to be even within sight. Moreover, it should be remembered that as working expenses are abnormally low, the net profit is proportionately high, and, as Mr. Stevens himself remarks, "The **net** profit provides the acid test."

System Worthy Of Thought

While any definite pronouncement regarding the merits of the system would at this stage imply jumping at conclusions, the results already obtained are worthy of very careful consideration. They have so far withstood the acid test of profit. Will they yet withstand the exacting test of time? Mr. Stevens has been operating on this system ever since the depression years, and he is very confident that they will.

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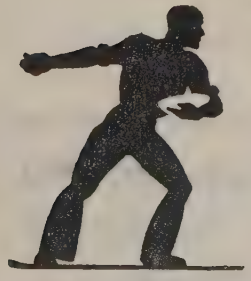

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Silico-superphosphate

New Fertiliser Mixture Has Possibilities

A. G. ELLIOTT, Crop Experimentalist, Wellington.

Recent experiments point to distinct possibilities for silico-superphosphate as a new fertiliser for N.Z. Further, the extra ingredient exists in inexhaustible quantities in accessible localities in N.Z., and may be obtained relatively cheaply.

SILICO-SUPERPHOSPHATE is the name which has been given to a mixture of superphosphate with ground serpentine in the proportions of three of the former to one of the latter. Serpentine, which occurs in extensive surface deposits in New Zealand, is a silicate mineral containing a considerable amount of magnesium and some iron, and also has present more than a trace of cobalt, the latter being the active principle in the control of "bush sickness" of stock.

The possibilities of the use of a material such as serpentine were foreseen by workers in New Zealand who were following investigations overseas. English work in 1927 had pointed to the possible role of silicates in plant nutrition, while Russian and German scientists made further studies, the results of which were published in 1932.

In Germany the effect of silicates on the uptake of phosphates by plants was reviewed, while in Russia attention was focussed on the use of dunite (a rock usually containing the mineral serpentine) as a conditioner for the rather acid type of superphosphate manufactured in that country. Comparatively small amounts of dunite were added to superphosphate for that purpose.

EXPERIMENTS IN NEW ZEALAND.

In New Zealand samples of dunite from Milford Sound were analysed by Mr. J. J. Cornes, of the Dominion Laboratory, who found that the magnesium was very soluble in dilute acid, and in September, 1938, he consulted the Chief Agricultural Chemist, Mr. R. E. R. Grimmett, with regard to its agricultural possibilities. Interested in the Russian work Messrs. Grimmett and Cornes investigated the reversion of superphosphate with dunite, and they considered that approximately 20 per cent. of this material needed to be added to superphosphate to secure reversion.

In collaboration with the Soil Survey Division it was decided to make an experimental quantity of silico-superphosphate by mixing one part of ground serpentine with three parts of superphosphate in an effort to secure complete reversion. In April, 1939, Messrs. Grimmett, Hoy and Holford, of the Department of Agriculture, manufactured this material at Messrs. Kempthorne, Prosser & Co.'s works at Wanganui, where 200 lb. of the material was made and used in field trials. At a later date, on the initiative of Mr. Holford, a commercial quantity, required for extensive experimental work, was manufactured with the co-operation of Mr. Cassels-Brown, of the Challenge Phosphate Co., Auckland.

FIELD TRIALS.

The first series of twenty of these trials was laid down in July, 1939, and subsequent months. These experiments were of the usual observational topdressing type on pastures, and were located in the North Auckland, Waikato, Waihi, King Country, North Taranaki and Southland districts on soil types which were considered by Dr. Grange to be those which locked soluble phosphates in forms unavailable to the plant. In addition, a mowing trial was laid down at the Marton Experimental Area in June of the same year.

Results of these trials have indicated that in the Waihi, North Taranaki and Southland districts, silico-superphosphate shows distinct possibilities as a fertiliser for grasslands. In view of these results an extensive series of some seventy additional observational topdressing trials, covering all districts in New Zealand, will be laid down in the near future. This series will be supplemented by large-scale half-paddock trials on a number of selected farms in areas of probable response to silico-superphosphate.

VALUE TO CEREALS.

As this material is a reverted superphosphate, it should be of particular value with swede, turnip and cereal crops. An intensive trial on swedes at Marton has indicated that this conjecture is likely to prove sound in practice. During the coming season the fertiliser will figure prominently in trials with annual crops.

On one of the pasture topdressing trials in North Taranaki and on one in Southland, analyses of pasture herbage have indicated an increased uptake of cobalt on areas topdressed with silico-superphosphate or serpentine. The possibilities of the use of this material as a substitute for cobaltised superphosphate on "bush sick" areas thus appear considerable. Preliminary work

also suggests that the magnesium content may be of value on some soil types, particularly those at Waihi.

SUMMARY.

Silico-superphosphate, which is made by mixing ground serpentine or dunite with superphosphate, offers distinct possibilities as a fertiliser in New Zealand. The following four salient features justify this assumption:—

(1) It is a reverted phosphate—that is, most of the phosphate, although not water-soluble, is available to the plants. Its value is therefore indicated on soils which "lock up" water-soluble phosphates and with those crops which are liable to germination injury.

(2) A considerable saving in phosphates is possible, as silico-superphosphate can be considered as a diluted superphosphate. In the present emergency this may be a vital factor.

(3) As Russian work and New Zealand experience has shown, serpentine or dunite improves the condition of superphosphate, lowers the moisture content, and makes a material less injurious to bags and more pleasant to handle.

(4) Minor elements, such as cobalt and magnesium, may prove valuable additional qualities in this material.

Finally, dunite and serpentine exist in inexhaustible quantities in accessible localities in New Zealand, and may be obtained relatively cheaply, so that the product silico-superphosphate should not be more expensive to manufacture than is superphosphate.

Obituary

Mr. A. S. Houston

THE death occurred in Wellington on March 19, of Mr. A. S. Houston, Secretary to the Department of Agriculture, and one of the best-known members of the Public Service. The late Mr. Houston was appointed secretary to the Department a little more than a year ago, succeeding the late Mr. W. C. Robinson. He was born in 1879 and had had 37 years' departmental service.

Mr. Houston was originally attached to the Government Life Insurance Department, where he worked in the Actuarial and Accounts Branches, and for the last five years in that Department as a Sectional Correspondence Clerk in the Mortgage Branch.

Seconded to the Defence Department in 1915, he was for approximately four years of the Great War attached to the War Expenses Branch, and from first relieving various senior officers during periods of sick leave he successively carried out the duties of officer in charge of the Allotment Section and then officer in charge of Soldiers' Pay Branch, a position he held until released from the Defence Department at his own request.

While holding that position he was for some time also carrying out the duties of Staff Clerk for the War Expenses Branch. During that period he inaugurated the scheme for payment of the gratuity to returned

Mr. A. S. Houston

soldiers which enabled claims to be actually paid at the rate of 1000 and upwards per day.

In 1920 he was transferred to the Department of Industries and Commerce to take over the accounting duties of that Department, but before taking up this work he was sent to Auckland to act as representative to the Department in dealing with the control of sugar and benzine, both of which were then in short supply and required to be rationed. He also acted as representative of the Board of Trade in the Auckland district.

While with that Department he relieved at Christchurch and acted as secretary to the Price Investigation Committee for Canterbury.

His service with the Department of Agriculture began in July, 1921, as farm clerk and accountant at the Ruakura Farm of Instruction. Later, he was appointed Inspector of Offices, and then Accountant, Head Office, in charge of the Accounts Division, which embraces the Departmental Accounts Section and the Investigational and Statistical Section.

Mr. Houston took a prominent part in the activities of the Public Service Association, and his passing will cause a vacancy that will be difficult to fill. He was at one time deputy chairman of the Wellington section and represented the Gisborne section on the executive committee. He was also a member of the Public Service Appeal Board, to which he was first elected in 1928, when the last regrading appeals were heard. He declined nomination in 1931, but was again elected in 1934. He was also chairman of the board of the Public Service Investment Society, Ltd.

Mr. Houston served in the South African War with the Seventh New Zealand Contingent and was wounded at Bothasberg on February 24, 1902. This was one of the severest engagements in which the New Zealanders were engaged in that war. Seven out of eight officers were struck down, and of the men twenty were killed and forty wounded. It is stated that only ten men came out of the fight untouched.

Mr. Houston leaves a widow but no family.

Winter Feeding of Store Pigs

By C. E. BALLINGER,
Research Officer in Animal Nutrition,
Ruakura Farm.

Home-grown Root Crops Are The Basis of Efficient Bacon Production

The whole question of efficient bacon production hinges on the wintering and fattening of more store pigs on home-grown roots Trials carried out at Ruakura show that it is profitable to winter pigs on roots, and that the addition of meat-meal makes the ventures still more profitable.

Pigs wintering on carrots and meat-meal for profitable bacon production in the spring.

THE growing of root crops for the economic overwintering of late autumn litters until the spring flush of milk is available is essential under New Zealand seasonal pig feed supply. Carrying pigs over the winter in store condition has been shown to be a practical and profitable part of pig-keeping, while the practice of disposing of light-weight pigs in the autumn, either as unfinished porkers or as stores, is one of the least desirable features of the pig industry.

With the recently-imposed restrictions on the quantity of pig meat to be exported as pork to 25 per cent. of the total pig meat exported, the growing of root crops for wintering pigs increases in importance, as maximum efficiency in the industry can be accomplished only by placing every possible pig on the hooks as a bacon carcass. This can be done only by holding the late autumn litters over the winter in store condition by the use of roots and small quantities of some protein concentrate. Light porkers and stores placed in the saleyards in the autumn merely lower our potential production, and in the present circumstances such pigs are not likely to realise even the poor prices obtained in previous years.

Winter Feeding Trials

Winter feeding trials in which pigs have been held in store condition for three months have been conducted each winter for the last three years at the Ruakura Animal Research Station. In these trials small amounts of concentrates, chiefly meat-meal and maize, have formed the basic ration. With these have been fed root-crops, chiefly swedes, but pumpkins and mangolds have also been utilised with good results. The trials carried out this year are along the same lines as the previous trials, details of which were published in the November, 1937, "Exporter" and in the July, 1939, "New Zealand Journal of Agriculture."

The 1939 trials, however, include the results obtained with copra and carrots as part of the winter ration. The growth obtained is given, and the returns for roots used are based on meals at cost and bacon at 6d per lb. In six out of seven cases the value of roots is actually greater than 5s per ton. This value may be questioned as being too low, and in answer to this objection Table 4 in this article shows the return per ton of roots fed after deducting from the spring saleyard value of the pigs the cost of meals plus the autumn value of the pigs.

In all the trials purebred Berkshire pigs were used, all rations were weighed, and refuse material was collected and deducted from the amount offered. The pigs were run in quarter-acre paddocks, and were fed twice a day for a twelve-weeks trial period.

Trial 1.—*Comparison of Pumpkins and Swedes.*

Pumpkins and swedes are similar in feed values, and both are deficient in protein. Pumpkins, however, are softer and more palatable, but while palatability is an important, it is not the limiting factor in the winter ration for store pigs. The limiting factor in winter feeding is the lack of protein in root crops and the cost of protein concentrates which turn wasteful feeding into profitable practice.

In a trial conducted in 1938 a group of pigs fed solely on pumpkins ate 1¼ tons per pig in 12 weeks and increased 7.08lb per pig in weight. A comparable group, fed pumpkins and ½ lb. of meat-meal daily, ate 1-3 of a ton less pumpkins in 12 weeks and increased 26.8 lb. Meat-meal fed with pumpkins made the pumpkins, after paying for meat-meal fed, three times as valuable as pumpkins fed alone.

Quite often lack of protein in a ration causes the animal to eat less of it, but in this case the opposite occurred.

Pumpkins Relished

Everyone who knows is impressed by the relish with which pigs eat pumpkins; many are deceived by the consequences of pigs eating too great a quantity of roots. This is discussed later under costs and returns. This trial was designed to test the palatability and compare the feeding value of swedes and pumpkins, and to provide specific information on the economics of high versus low root consumption.

Two comparable groups of pigs were placed on the following rations:—

Group 1.—½ lb. meat-meal per pig per day and pumpkins to appetite.

Group 2.—½ lb. meat-meal per pig per day and swedes to appetite.

The results of these treatments may be seen in Table 1.

TABLE 1.

Live-weight Increase (lb.)

Group.	1	2
No. at commencement .	12	12
No. at end of trial . .	12	12
Av. initial live-weight .	68.75	69.16
Av. final live-weight . .	110.25	92.5
Av. Increase live-weight	41.5	23.4
Av. increase per pig per day	.49	.27
Roots eaten per pig . .	2862.0	1126.0
Roots to produce 1lb. live-weight . .	68.9	48.4

Group 1 ate very many more roots, and also grew faster. If, however, allowance is made for meat-meal eaten, the pumpkins returned 7s 3d per ton and the swedes 5s 10d per ton respectively. Because of the greater palatability of pumpkins and the greater amount eaten, their feeding value, based on this technical calculation, is slightly greater than that of swedes. It would be the same as swedes if equal amounts were eaten.

As will be pointed out later, the greater palatability of pumpkins is no advantage; in fact, careful rationing is necessary if the best use is to be made of them.

Trial 2.—*Maize and Copra.*

It was shown in the 1939 trials that maize and roots are not a satisfactory combination for wintering pigs due to the lack of protein in the ration. Maize fed in conjunction with roots and some protein supplement is, however, a most valuable concentrate, and when fed as part of the winter ration it tends to prevent that very loose condition of the excreta so prevalent when only roots and meat-meal are fed.

A trial was also conducted using copra as part of the winter ration. It was thought that if the copra proved successful it would be possible to im-

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port the lower grades of copra from the Islands for pig feeding, a trade which would be of mutual benefit to both the pig industry of New Zealand and to the Islands.

A consignment of copra was procured. and an analysis of it was as follows:—Dry matter, 95 per cent.; total protein, 6.96 per cent.; fat, 63.3 per cent. The total protein and fat are calculated on the dry matter.

The analysis shows that the protein-content of copra is too low for it to be suitable for winter feeding unless supplemented by some protein concentrate or skim milk. The high oil-content was another factor to be considered. as it might upset the digestion of the rations.

To investigate the value of maize and copra as forming part of the winter ration three comparable groups of pigs were placed on the following treatments:—

Group 3.—1 lb. of meat-meal and swedes to appetite.

Group 4.—½ lb. of meat-meal and ½ lb. of maize corn and swedes to appetite.

Pigs wintering on pumpkins and meat-meal. Pigs worth 10/- in the autumn and £2/15/- in the spring are wintered for a cost of 4/10 for meal.

Group 5.—½ lb. of meat-meal and ½ lb. copra and swedes to appetite.

The results of these treatments may be seen in Table 2.

One pig died in each of the Groups 4 and 5, but this cannot be attributed to the feed used. The live-weight gains of pigs in these groups were actually better than those of Group 3, and the root consumption of Group 5 was least of all. This was probably due to the high oil, and therefore high energy, content of the copra compared with that of the meat-meal and maize. This would allow the pigs in Group 5 to reduce their consumption of swedes while maintaining a growth rate comparable with Groups 3 and 4.

There is no reason to doubt that copra fed with some protein concentrate can be used as part of the winter ration for store pigs. In the above trial the copra was fed as pieces 2 or 3 inches square, and was eaten more readily when soaked in water for 12 hours before feeding. The pigs which were fed copra were quite healthy in appearance, and compared favourably with the other groups.

In these three trials the values of roots after paying for the meal **used** are:—Nil, 5s 5d, and 7s 10d per ton respectively. From this it would seem that an addition of maize or copra to ½ lb. of meat-meal is better than an increase in the amount of meat-meal to 1 lb. per pig daily.

TABLE 2.

Live-weight Increase (lb.)

Group.	3	4	5
No. at commencement	12	12	12
No. at end of trial	12	11	11
Av. initial live-weight	56.4	57.0	54.5
Av. final live-weight	82.5	89.18	87.0
Av. increase live-weight	26.1	32.18	32.5
Av. increase per pig per day	.31	.38	.38
Roots eaten per lig (lb.)	783.0	781	670
Roots to produce 1lb. live-weight	30.0	24.2	20.6

Pumpkins, carrots and swedes for winter feeding. They bring a return of up to £4/16/- a ton as pig feed.

Trial 3.—*Carrots.*

Carrots are generally looked upon as a crop of more than ordinary value for pig feeding, and there is no doubt that under stied conditions, or where grass and sunshine are lacking, the value of carrots is unquestioned. The two main attributes of this crop are its palatability and a potential source of vitamins. Palatability has already been shown to encourge consumption. but its value in winter feeding is governed by other limiting factors, while

under open-air conditions of pig keeping, with sunshine and good pasture. it is doubtful whether any other source of vitamins is necessary.

The feeding value of carrots as shown by their composition, and digestible nutrients ranks them with pumpkins and swedes. To obtain information on this crop as a means of wintering pigs two groups of stores were placed on the following treatments:—

Group 6.—½ lb. of meat-meal per pig and carrots to appetite.

Group 7.—1 lb. of meat-meal per pig and carrots to appetite.

The results of these treatments may be seen in Table 3.

TABLE 3.
Live-weight Increase (lb.)

Group.	6	7
No. at commencement	12	12
No. at end of trial ..	10	11
Av. initial live-weight .	56.1	56.6
Av. final live-weight ..	91.3	99.0
Av. increase live-weight	35.2	42.7
Av. increase per pig per day	.4	.5
Carrots eaten per pig (lb.)	1357.0	1438.0
Roots to produce 1lb. live-weight ..	30.0	33.6

It will be seen that the growth rate obtained with carrots is satisfactory in both cases. After paying for meat-meal used Group 6 returned 12s 4d and Group 7 returned 8s 1d per ton of carrots eaten. When the values of roots are estimated on this strictly technical basis it is more profitable to feed only ½ lb. of meat-meal than 1 lb. daily. This was also true for swedes (see Groups 2 and 3).

It will be seen, also, that carrots have a higher feeding value than swedes, and this is technically correct, but, as has been so often pointed out, neither the actual feeding value nor palatability can decide the values of root crops. The yield per acre, suitability to a district, and costs of growing a crop are the chief factors in deciding the relative value of any root crops.

Returns for Roots

There is a strong objection by many farmers to the growing of root crops, owing, it is said, to the cost of cultivation. The area required to produce sufficient roots to over-winter the late autumn litters is, however, very small. Half a ton of roots will winter a pig for three months, so that the quantity of roots required to winter 20 or 30 pigs can be grown on half an acre. Wintered stores are in keen demand in the spring, and sufficiently high prices are obtained for them to make the growing of root crops well worth the effort.

A number of pigs are wintered every year and sold as stores in the spring. Men who do this find it profitable, and the real value of roots is more correctly assessed by following their practice of adding the autumn value of the store pig to the value of purchased meals used, and subtracting the sum of those from the spring value of the store pig and crediting this difference to roots used. This has been done in the following table. Pig values are those actually obtained at auction in autumn and spring.

TABLE 4.
Return for Root Crops.

Groups.	1	2	3	4	5	6	7
Sale value spring ..	55/–	47/6	42/6	47/6	47/6	47/6	50/–
Concentrates ..	4/10	4/10	9/8	9/4½	9/0½	4/10	9/8
Sale value, autumn	12/6	12/6	10/–	10/–	10/–	10/–	10/–
Difference credited to roots ..	37/8	30/2	22/10	28/1½	28/5½	32/8	30/4
Root consumption (approx.) (ton)	1.25	.5	.34	.34	.29	.6	.64
Return per ton (approx.) ..	47/1	60/4	68/6	84/4½	96/9	54/4	52/6
Return per acre *	941/–	1810/–	2055/–	2531/–	2802/–	1353/–	1312/–
Crops used ..	Pumpkins	Swedes	Swedes	Swedes	Swedes	Carrots	Carrots

*Swedes, 30 tons; carrots, 25 tons; pumpkins, 20 tons per acre.

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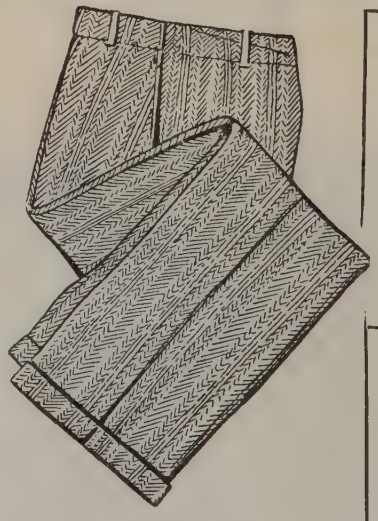

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The value of roots per acre is very high, but this is due to the high price paid for store pigs in spring. However, after increasing the autumn value of pigs or decreasing the yield of roots per acre the value of roots is still high, and it is evident that the growing of small areas of root crops is a profitable part of pig-keeping while spring pigs are in such demand.

A second examination of the table makes it evident that the value of roots is very largely bound up with the amount consumed per pig. In Group 1, where 1¼ tons are eaten, roots are valued at 47s 1d per ton; in Group 5, where less than one-third of a ton is eaten, roots are valued at 96s 9d. It is very evident that roots are a treasured commodity which should be used sparingly, and with a little meat-meal or other meal to carry as many pigs as possible through the winter in good healthy condition. Used to keep more pigs alive and healthy through the winter, roots would remove many of the serious difficulties of the pig industry.

The following table sets out the amounts of roots to feed per week in order to get the best return for them.

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TABLE 5.

Root consumption for Pigs of 55-100lb. live-weight.

Period (weeks) ..	1	2	3	4	5	6	7	8	9	10	11	12
Consumption per week (lb.) ..	60	70	77	84	90	98	105	112	118	124	128	130

Insufficient Pigs Wintered

There is no doubt that the high price of store pigs in the spring is the chief cause of the production of the heavy, overfat bacon pigs. These spring pigs are sold at more than 8½d per lb. of carcass, and buyers are obliged to make such pigs into overfat baconers in order to get their money back. Actually, more than 1s per lb. is paid for any carcass increase due to winter feeding, and when the selling schedule is 6d per lb. this means that the fattener has to put on at least 40 lb. of carcass to these pigs before he gets his money back.

Table 6 shows the difference between autumn and spring values, and the calculated cost of producing 1 lb. of winter carcase.—

The whole question of efficient bacon production hinges on producers wintering and fattening more store pigs on home-grown crops.

Roots Need Not Be Wasted

If, by good fortune, there are more than enough roots to winter all the pigs available, the residue can be used most profitably when the milk supply is insufficient in spring or is required for sows and litters. Forty per cent. of the fattening ration can be fed as roots—that is, the ration will consist of 30 lb. of roots and 2 to 2½ gals. of the carcase increase in winter, milk or 2 to 2½ lb. of meal. At the other end of the season roots supplement a falling milk supply in the same way. Such a ration is satisfactory in every way; a good rate of growth is maintained, and a high-grade carcass is produced.

The importation of cheap grain for pig fattening and winter feeding is often urged as being essential, but it is only when we reach the point where we have made the fullest use of the by-products already produced in New Zealand by making roots the main source of feed and feeding small quantities of by-products with these roots, that we need to look for supplies of grain from other countries for wintering store pigs.

TABLE 6.

Costs for Carcases Increase.

Groups.	1	2	3	4	5	6	7
Difference credited to roots ..	37/8	30/2	22/10	28/1½	28/5½	32/8	30/4
Carcase increase (lb.) * ..	29.0	16.2	18.2	22.4	22.75	24.6	29.8
Price paid per lb. (approx.) ..	1/3	2/–	1/3	1/3	1/3	1/4	1/–

* Calculated at 70 per cent. of the live-weight increase.

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Grasses and Clovers of New Zealand

Clovers are the Key to High Production

— By —

S. H. SAXBY,

Instructor in Agriculture, Dunedin.

Fig. 62.—Clover—the backbone of New Zealand's high producing pastures. [*S. H. Saxby, photo.*

With this instalment of the series of articles on the grasses and clovers of New Zealand, a start is made with the description of the principal varieties of clover found in the pastures of the Dominion. One can safely say that clover is the backbone of high-producing grasslands.

PASTURES without clover will not give high production, whether it is of meat or of milk. The chief reasons for the importance of clover are twofold. Firstly, many of the clovers produce a large amount of succulent and attractive feed which in itself is of great value. Secondly, in common with the majority of the plants in the same family they have the means of making available to the grasses of the pasture, the all-important nitrogen without which the high-producing grasses will not thrive. This nitrogen can be supplied in three ways, through clover, through stock, or through artificial manures. All are equally effective while they last.

Nitrogen supplied through artificial manures is both expensive and does not give prolonged results, its use being justified only under special and comparatively rare circumstances. Nitrogen furnished through stock is invaluable and is ultimately, in a large part, responsible for the well being of a high-producing pasture. However, in order to render this form of nitrogen effective over large areas, the pastures must in the first instance be sufficiently vigorous to enable them to feed sufficient stock. This initial vigour is supplied by clover. A well-balanced grass and clover pasture is almost always vigorous and is a "milk" producing pasture rather than a "store" produring pasture, whether the clover is white clover, subterranean clover, or red clover.

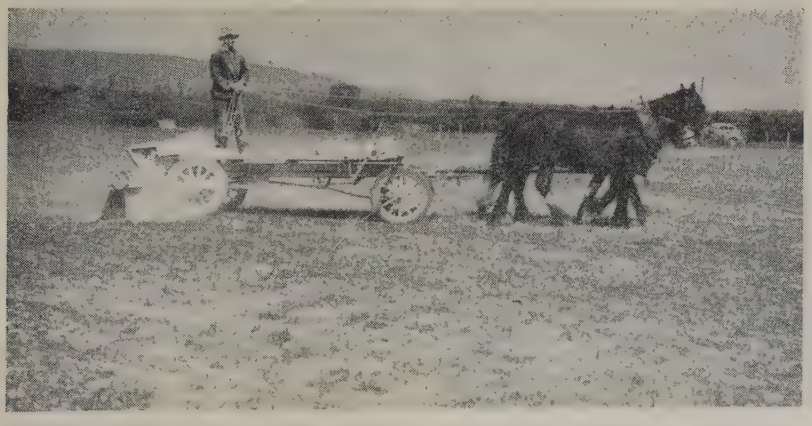

Fig. 63.—Practically all topdressing of pastures, whether with lime or phosphate, aims at the strengthening of the various clovers. [*S. H. Saxby, photo.*

Chief Value of Clover

The chief value of a clover depends therefore on its ability to grow vigorous and attractive feed, at the same time liberating sufficient nitrogen for the associated grasses. A cloverless pasture is harsh and stunted, whereas a pasture with a vigorous clover is vigorous and succulent.

The different species of clover vary greatly in their utility and habitat ranges. Some clovers will thrive only under wet conditions, while others will thrive under very dry conditions. According to their various soil fertility and moisture requirements, so can one evaluate the clovers.

The clovers as a whole give the best returns for phosphatic manuring. Grasses benefit by it to a much lesser degree. All the phosphatic topdressing in the country aims at an increase in grass production through the clovers. The topdressing of pastures without any clover gives an almost negligible

return. In certain districts lime also encourages clovers, both by rendering the soil acidity suitable for the growth of clover and also by ensuring that the phosphates applied are kept in a state that will be available to the clovers.

Apart from the production of useful feed, the value of a clover may be judged by its utilisation of phosphates. The best clovers are those that respond most readily to phosphatic to topdressing.

Two Main Groups

There are two main groups of clovers, namely, annuals and perennials. Just as a perennial grass should be used for permanent pastures where possible, so should a perennial clover be used where this is possible. A perennial clover should be encouraged at the expense of an annual clover. This is because perennial clovers have a long season of growth which carries them through the summer, whereas annual clovers have finished their production before mid-summer, with a resultant drop in production and an opening up of the sward.

Another valuable feature of clovers is in their ability to conserve moisture. This is most noticeable with white clover. A pasture with a good clover bottom will remain moist much longer in dry weather than will a pasture without clover on account of the clover providing a bottom cover to the pasture and preventing excessive evaporation. In the identification of the various clover plants the following terms are used:—

Stipule—Membranous organs occurring at the junction of the leaf stem and the stalk. They vary greatly in size, shape, and veining. White clover for example, has only a small stipule, whereas in alsyke they are long, pointed, and distinctly veined.

Stolons.—Over-ground creeping runners which root at intervals. White clover has stolons.

Fig. 64.—White clover—"The King of Clovers"—a high producing and permanent clover that combines well with other high producing pasture plants. [*S. H. Saxby, photo.*

White Clover (*Trifolium repens*) is unquestionably one of the most valuable pasture plants in New Zealand, and with suitable treatment will thrive on a wide range of soils. It demands high fertility and grows luxuriantly on well-drained soils where there is an ample supply of moisture. It produces a large amount of attractive feed which is relished by all classes of stock, and may be used for hay, ensilage, or for grazing. The main factors limiting its growth are lack of available phosphate, water-logged conditions, or extremely dry conditions.

Fig. 65.—The result of not sowing white clover is reflected in the unthrifty nature of the ryegrass in the foreground. [*S. H. Saxby, photo.*

Unequalled Characteristics

As a permanent, high-producing clover with a long productive period it is unequalled. It will stand hard grazing and on this account is a valuable associate of ryegrass. On account of its creeping, mat-forming habit, white clover is more suited for closely-grazed sheep pastures than are some more erect-growing and high-crowned clovers such as alsyke or red clover.

White clover is the most efficient clover in the utilisation of phosphate and is also the most prolific nitrogen-forming clover. White clover should always be included in pasture mixtures if there is any possibility of its being made to thrive. One frequently hears the statement, "This is natural clover country and there is no need to sow it here." That white clover seed is already in the ground may be quite correct, but this does not mean that there is no need to sow it.

Experience gained from both experiments and farmers throughout the country show that waiting for the clover to come in frequently takes three years or more, during which time the sown grasses do not thrive and in some cases may die of virtual

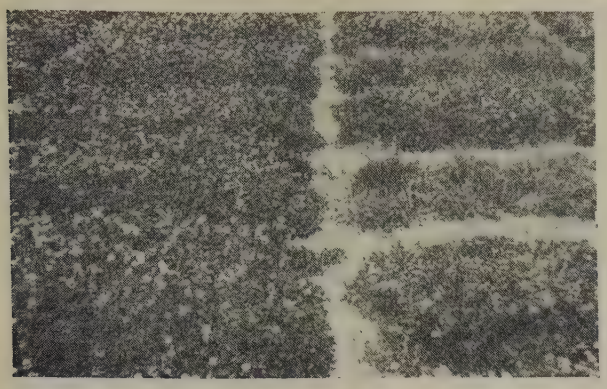

Fig 66.—The recognition of superior strains in white clover is just as important as is the case with other pasture plants. On the left is a series of plots of pedigree white clover, while on the right are several ordinary commercial lines.

[*S. H. Saxby, photo.*

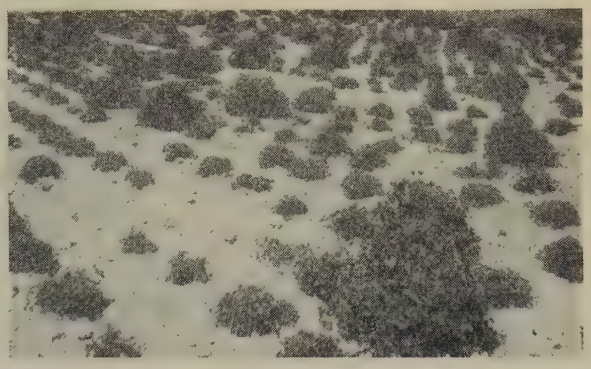

Fig. 67.—The breeding of superior strains of pasture plants is playing an important part in the improvement of our grassland production. Here is shown one stage in the selection of a superior strain of Montgomery Red Clover. This work is being carried out by the Grasslands Division of the Plant Research Bureau.

[*S. H. Saxby, photo.*

starvation. Provided that conditions such as soil preparation, fertility, and moisture are satisfactory and that the clover is not smothered out in the initial stages a good cover of white clover should be obtained in one year or less from the time of sowing.

Adjunct to Ryegrass

Failure to establish white clover in pastures has in many cases been responsible for adverse opinions regarding the perennial strains of ryegrass. This failure to establish the clover has in many cases been due to the strong competition resulting from a vigorous establishment and heavy seeding of ryegrass.

With the use of short-lived strains of ryegrass, the spread of either sown or volunteer clover is quite rapid after the ryegass has commenced to die out after the first year. But with a true perennial strain the competition is maintained, thus rendering the sowing and encouragement of white clover all the more necessary.

The establishment and maintenance of white clover may be made more certain by the observance of the following basic principles.—

1. The soil should, where necessary, be limed sufficiently to reduce the acidity to a state where clover will thrive. White clover will not thrive on acid soils. Practically all the liming of pastures is carried out with the object of reducing the soil acidity to a condition favouring the healthy growth of white clover.

2. New Zealand soils are, on the whole, deficient in phosphate. This deficiency varies greatly from district to district. When the soil acidity of the soil is correct, very few plants benefit as much from phosphate as white clover.

Importance of Seed Bed

3. A deep and firm seed bed is essential for the successful establishment of "small seeds." A loose and rough seed bed is bad for the establishment of clovers. Much seed is lost through lack of covering or too deep covering, and the seed which germinates is liable to be killed through the drying winds evaporating the small amount of available moisture.

4. The time of sowing varies with the climate and district, but on the whole late autumn sowings are liable to be very risky, especially in frost susceptible districts. White clover, when in the primary stages of development, is very susceptible to frost damage. Except in districts which usually experience a long dry summer, spring sowing is preferable to summer or autumn sowing. Even in these districts, provided that it is sown early enough and becomes well established before summer, white clover will survive a considerable period of dry weather.

5. Management has a considerable bearing on the ultimate success or failure of clover in the sward. Repeated hay or seed crops reduce the amount

Fig. 68.—Two contrasting strains of white clover. In the centre behind the peg in the plot of Kentish wild white clover. Surrounding it are plots of pedigree white clover. The photograph was taken in August and shows the superior spring growth of the pedigree strain.

[*S. H. Saxby, photo.*

of clover in a pasture, while close spring grazing and lenient summer grazing will increase it. In some districts clover gains the ascendancy in the pasture. Here it is necessary to encourage the growth of grass in the spring by the use of nitrogenous fertilisers in order to effect a smother and partial suppression of the clover. In the more fertile districts in New Zealand clover does occasionally become too aggressive, but speaking generally the encouragement of white clover throughout New Zealand is essential if first-class pastures are to be produced and maintained. Those farmers who have too much clover in their pastures have a much easier problem to solve than those who have but a scant amount.

Fig. 69.—**Red clover in conjunction with Italian ryegrass should form the basis of most temporary pastures, whether they are used for hay or for grazing. This red clover pasture is fattening lambs on the aftermath following a heavy hay crop.**

[*S. H. Saxby, photo.*

Strains of White Clover

Research work has shown that there are a number of distinct strains of white clover which vary greatly with regard to earliness of spring growth, total production, and persistency. One particular type which is early away in the spring, high producing and persistent, is certified by the Department of Agriculture and under all conditions is to be preferred to the ordinary commercial strain which is poorer in all respects.

Imported Dutch white clover has made a very poor showing wherever tried out in New Zealand. Another type, Kentish wild white clover, is very persistent and as far as the production of clover nitrogen is concerned is at least equal to the best New Zealand white clover. It has the disadvantage, however, of starting growth very much later in the spring than the other strains. It may be of use on second-class country just too poor to maintain the high producing certified type.

The characteristic features of white clover are short stipules, overground runners, and heart-shaped leaflets. The plant is hairless. Large leafed forms may be confused with red clover, but may be readily distinguished by the hairy nature of the latter. Strawberry clover is very similar to white clover but differs in that the leaflets are dark green and oval in shape.

Red Clover or Cowgrass (*Trifolium pratens*). — Throughout New Zealand red clover is known by one or other of these two names. At one time there may have been a difference between the two, but at the present time the only difference is in the appearance of the seed and the price. The better-looking seed is usually classed as cowgrass and is sold at a higher price.

Two Distinct Strains

There are two distinct strains of red clover on the market at present and they differ so widely in their main uses that it is necessary to describe them separately. These strains are—the New Zealand or broad red clover, and the Montgomeryshire extra late flowering red clover.

Broad red clover is essentially a short-lived type of clover, its useful life seldom exceeding two or three years. Broad red clover is very quick to establish and is admirably suited to short rotation pastures where an early and high producing clover is required in conjunction with Italian ryegrass for spring feed or an early hay crop. For permanent pastures it is of use only as a temporary element. It is an excellent hay plant and makes good aftermath growth.

Montgomeryshire extra late flowering red clover is usually referred to as "Montgomery red" and is a much longer-lived type than broad red

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clover. It also commences growth much later in the spring. Its main virtue is in its permanency, which is due to both a natural feature and to the fact that the crown is below ground level, thus reducing the amount of damage due to close grazing by sheep.

Fig. 70.—As a grazing proposition red clover is of most value in the autumn. Note the feed produced on the right, where red clover was included in the mixture.
[*S. H. Saxby, photo.*

A persistent red clover is very valuable, especially on the somewhat light soils that are inclined to dry out in the hot weather. Under these conditions Montgomery red clover on account of its deep-rooting habit and its late seasonal growth provides very useful feed at a time when the majority of grasses and even white clover are dying off in the summer. Under these conditions its lateness to commence growth in the spring is an advantage. Contrary to a general belief Montgomery will persist quite well under continuous haying. This has been conclusively demonstrated both in Canterbury and Southland.

Fig. 71.—White clover on the left with alsike on the right. Note the long stipule at the base of the leaf stalks in alsike. These are much less prominent in white clover.
[*H. Drake, photo.*

Fig. 72.—On country that is too wet or too saline for white clover, strawberry clover is of great value.
[*S. H. Saxby, photo.*

Harvesting Point

The main point to be watched when haying or seeding Montgomery red clover is that of cleaning up all dead and surplus growth as soon as possible after harvest. If the crop has been very tangled and difficult to cut, a considerable amount of roughage is usually left. If this roughage remains over the winter it is very liable to cause the crowns of the plants to rot and the plant to die.

The successful establishment of red clover is not as difficult as is the case with white clover, but similar precautions should be taken in order to ensure that the clover is well established by the winter. Like white clover, young

red clover plants are very liable to frost injury and frost lift.

Red clover may be distinguished by its hairy nature, its erect habit or growth, and the long, somewhat hairy stipules.

Aliske (*Trifolium hybridium*). — As its botanical name implies, this clover is in many respects intermediate between white clover and red clover.

Although it will grow on a fairly wide range of soils, it will thrive only under conditions of high fertility and an ample moisture supply. It will stand up to more severe frost and cold than other clovers, especially in the young stages. In total production it is considerably lower than red clover and not a great deal greater than the better strains of white clover, and for these reasons the sowing of it is not warranted where both of these clovers will thrive.

Place of Alsike

On country liable to periodical flooding and not grazed hard, alsike is more or less permanent and is a better proposition than red clover for hay purposes. Because of this, the sowing of alsike is warranted chiefly on country that is normally sown in timothy-fox tail-dominant mixtures.

As far as the production of nitrogen is concerned alsike is much behind white clover and the latter should never be excluded in mixtures in favour of alsike.

On the whole the widespread use of alsike cannot be recommended, as both permanent strains of red clover and high-producing strains of white clover are procurable, and the amount of country that is too wet for these is very limited.

Alsike may be recognised chiefly by its erect habit, its hairless nature, and its long pointed stipules.

Strawberry Clover

Strawberry Clover (*Trifolium fragiferum*) is a perennial clover of great value on a limited amount of country in New Zealand. Just as subterranean clover is the next best to white clover when conditions are very dry, so is strawberry the next best when conditions are too wet or too saline for white clover to grow.

On good country that is well drained, strawberry clover, although permanent, is low in production compared with white clover and the sowing of it is not warranted, but on saline or boggy country it is of great value and is infinitely better than any of the annual clovers that will grow there.

Strawberry clover may be introduced either by cuttings, turfs, or seed, all of which methods are quite satisfactory. After the first year strawberry clover spreads fairly rapidly by means of overground runners. The main disadvantage of strawberry clover is that it is a shy seeder and difficult to harvest, and this, combined with the fact that the demand for it is relatively small, results in the price of the seed being rather high.

Strawberry clover is very similar to white clover in growth, form, and general appearance, but may be distinguished by its comparatively long, darker green, and oval-shaped leaflets.

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Heavy Pumpkin Crop

A self-set Triumble pumpkin last season, in the Auckland district, carried 86 pumpkins on the vine, of which 82 matured. The total weight of the crop was 5 cwt. 10 lb., and the average weight of the matured pumpkins was approximately 8 lb. each. The only attention given to the vine was to keep the runners shortened back to about 10 ft. in length. No manure was applied nor any cultivation given.

Competition For Best-kept Farm

J. E. BELL, Instructor in Agriculture, Auckland.

Above.—Some of the shelter on Mr. E. K. Wright's farm. There is some ground draught in this belt which is entirely absent in other shelter on the farm which is planted in the gullies. *Right.*—Pearson Bros.' concreted way out from the cowshed, seen in the distance. Note the full-grown barberry hedge extending along the westerly side of the concreted path.

FIELD competitions of different kinds have been held in the Maukau district for many years. These were fostered by the local Farmers' Union and, beginning with a mangold crop competition, now include pasture, hay, ensilage, and swedes as well.

Because the district is small, the number of entries have not been large and do not compare with the number of entries in the Taranaki district, the home of such competitions. Nevertheless, the local farmers have kept up their enthusiasm, and last winter a new and rather novel competition was introduced by Mr. H. E. R. L. Wily, a local farmer, who has also presented a handsome cup for the winner. The competition was for the best-kept farm of more than 40 acres. The points were given mainly for method and neatness and covered many aspects of farming. The points allocated were drawn up by the farmers with additions and modifications by officers of the Department.

The competition was judged by Mr. J. J. Raper, a farmer, of East Tamaki, and myself at the end of June this year. There were 13 entries, and it took a little over three days to judge them. Very keen interest was taken by competitors and their neighbours as judging progressed. Mr. Raper and I gave the approximate pointings to each farmer after we had gone round the farm. Reasons for the pointings allocated were given if asked for.

The results were as follows for the first three farms:—

	Possible Points	Pearson Bros.	E. K. Wright	J. Paton
Farm buildings	15	13	12	12
General layout	20	17	17	16
Water supply	25	21	20	20
House, garden and orchard	15	13	13	12
Gates, fences and hedges	10	8	8	8
Shelter	20	15	16	14
Pasture management	30	27	26	27
Condition of stock	15	14	14	12
Farm equipment	15	13	13	12
Winter feed	20	17	17	16
Hygiene	15	14	14	11
	200	172	170	160

The explanation of the way the competition was judged is as follows:—

Farm Buildings.—Points were given for care and attention to the buildings, and not to the spaciousness or value of them.

General Layout.—Points were given for the general planning of the fence lines, and the placing of the buildings and farm house.

Water Supply.—Points were given according to how well the farm was watered and the condition of the troughs and drinking places. The kind of water supplied was also given consideration.

House, Garden, and Orchard.—Points were given for the amount and quality of vegetables and flowers, for the care

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of the house as viewed from the outside, for attention to the fruit trees. and for neatness generally.

Gates, Fences, and Hedges.—Points were allocated for the condition of the gates, higher points being allocated for wooden gates than for wire ones. and for the construction and stability of the fences. Points for hedges were given only as far as they affected the segregation of the stock. Their value as shelter was not given consideration.

Shelter.—Points were given to potential as well as full-grown shelter. Thus, a newly-planted belt of trees or a young hedge scored points, although they did not afford any shelter.

Pasture Management.—Points were given for the control of the pastures. Under-grazing or over-grazing meant loss of points; good drainage and freedom from weeds scored points.

Condition of Stock.—Points were given for the condition of all stock at the time of judging.

Farm Equipment.—Most of the farm equipment, including tools, implements and machinery, were under cover. Points were given for the method of stowage as well as for the condition of the implements. Points were not given for the quantity and value of them.

Winter Feed.—Points were given for amount and quality of pasturage saved, and the hay, ensilage, green feed, and roots on the farm at the time of judging.

Hygiene.—Points were given for cleanliness, particularly about the cowshed, piggeries, woolshed, and sheep yards.

It will be seen from this description that a farmer would necessarily have to be efficient to win such a competition. The farm winning the competition is about 130 acres in area. It can be rightly described as a utilitarian farm. Where good materials were required they were used, yet there was very little expense for show purposes. The farm is well subdivided, most of the fields being about three acres in size.

Milking cows on Mr. Worthy's farm being rationed on the saved grass in mid-July.

A view of A. Woolsey's well-sheltered home fields.

Water is laid on to every field. Every fence line has been under-planted with seedless barberry, which has been raised on the farm by planting cuttings in the garden. These hedges are at various stages of growth.

The farm at present lacks high shelter, but when the barberry hedges are fully grown good shelter will result, because the farm lies fairly well and the fields are small. The buildings are plain but well looked after, being tarred to preserve the timber. At the time of judging—at the end of June—there were still about 15 acres of grass about six inches to one foot high. Hay supplies, however, were short.

The feature of Mr. Wright's farm was the neatness everywhere and the excellent high shelter. The gullies had been planted in mixed trees, including eucalyptus and pines, and afforded high shelter with no ground draught. The drainage from the pig sties was piped away underground. As has been seen, Mr. Wright ran Pearson Bros. a very close second.

Horses will consume much more hay when fed in racks. (Pearson Bros.' Farm.)

Does Severe Harrowing Improve Pasture Production?

Value Questioned on Highly Productive Swards Under Sheep Grazing

— By —
A. G. ELLIOTT, Crop Experimentalist
and P. B. LYNCH, Assistant Crop Experimentalist,
Fields Division.

Investigations carried out at the Marton experimental area have shown that drastic harrowing of a highly productive pasture grazed by sheep gives no improvement in production.

MANY claims have been made of the benefits which may be expected from the drastic harrowing of swards. Terms such as "root pruning," "soil aeration," "pasture cultivation," and so forth have been freely used to impress the farmer. However, little accurate knowledge as to the value of such severe treatment of good swards has been available, and to test the claims of improved production from such treatment a mowing trial was laid down in July, 1934, at the Marton Experimental Area. As production figures are available from September, 1934, to September, 1939, it has been possible to make an exhaustive study of the effects of drastic harrowing of pastures.

It must be realised at the outset that the applications of the results of this trial are limited to **drastic** harrowing of well-managed, highly-productive swards under sheep grazing. The value of light or chain harrowing or of even more severe treatment to spread stock residues is not questioned, as this is an essential feature of correct pasture management especially under conditions of high concentration of dairy stock. Similarly, the drastic harrowing of "sod-bound" swards, particularly of such species as paspalum, is another question altogether. The use of severe harrows also has a definite place in the preparation of pastures for the surface sowing of grasses and clovers, and particularly of subterranean clover.

Above—
The layout of the plots and the method of mowing.

Below—
The mowing machine and catcher used on the trial.

What is questioned is the regular practice of drastic harrowing of otherwise well-managed pastures containing highly-productive species such as ryegrass and white clover, on land of reasonably good drainage and stock-carrying capacity.

Details of Trial

The trial area was sown down in 1930, the soil being a rather heavy loam.

One ton of ground limestone and 2cwt. super were applied in July, 1934, and the first harrowing was made on the 30th and 31st of the same month. The following harrowings were carried out annually:—

TREATMENTS.

1. No harrowing.
2. Autumn harrowing (April-May).
3. Autumn and winter harrowing (April-May and July).
4. Winter harrowing (July).

Each harrowed plot received two strokes of the harrows, the second stroke being at right angles to the first. The depth of penetration was from 1 to 1½ins. An annual dressing of 3cwt. lime each winter and 4cwt. superphosphate (2cwt. in December and 2cwt. in March-April) was applied to all plots. The trial was under an "alternate mowing and grazing technique" and under this method sheep grazing alternated with mowing.*

Dry matter determinations were carried out, and the final summary of results of five years' production is as follows:—

Table 1: Dry matter in lbs. per acre and relative yields (No harrowing = 100) based on dry matter for the period 14th September, 1934, to 18th July, 1939.

Treatment.	Dry Matter (lbs. per acre.)	Relative Yields.
1. No harrowing	48,014	100
2. Autumn harrowing ..	47,669	99.3
3. Autumn and winter harrowing	47,119	98.1
4. Winter harrowing ..	46,595	97.0

There were no statistically significant differences between the production of green herbage from the four treatments, so that the apparent slight depressing effect from harrowing is within the limits of experimental error. One can certainly say, however, that the production of herbage has not been increased by any of the harrowing treatments.

Seasonal Effect

Observations on the plots appeared to show that the effect of harrowing was to check growth for a period, but the weights of herbage do not show this effect to any marked degree. The reason for this was probably due to the fact that the time of harrowing was such that a low production period followed it, during which period there would be little, if any, growth to cut. Otherwise no seasonal effect of harrowing was in evidence.

*Hudson, A.W.: "Measurement of Pasture Production," Bulletin No. 11, I.A.B. Herb. Publ. Series.

"Was he a member of the A.M.P.?"

The first thought when a man's death is reported

NOTICE of a friend's death appears.

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As a fact, he had long ago arranged with the A.M.P. that, on his death:

(1) £200 would be available to clean up any debts he might leave;
(2) £600 would be available to pay off a mortgage on his cottage,
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Through the A.M.P you could make some such arrangement. Ask the nearest A.M.P. office to send a representative to talk the matter over with you. Your need may be larger or smaller than this newsagent's. Whatever it is, let the Society lift the responsibility from your shoulders. Ask to-day.

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During most of the time the trial was laid down, no differences were observed between the type of sward and its appearance on any of the treatments, but the "no-harrowing" plots were frequently more attractive than the rest. This was in accord with the mowing weights.

In the early stages of the trial Plots 4 (winter harrowing) looked the best of the harrowed plots, but in the last year the autumn harrowed plots (Treatment 2) were sometimes superior. However, there were no consistent differences. In dry periods during the summer months the soil of the harrowed plots cracked open badly, and thus production from these treatments was lowered. The marks of the harrows could often be traced many months after the harrowing was completed.

Botanical Composition Of Sward

The sward at laying down in 1934 was given as one "perennial ryegrass and crested dogstail dominant; white clover sub-dominant, with some sweet vernal"—a typical sheep pasture. With topdressing and good utilisation, however, the pasture improved somewhat, and when the first botanical analysis of the mown sample was carried out in August, 1938, the dominant species were perennial ryegrass, cocksfoot, and white clover. Details of the percentage of each species at subsequent cuts are as follows:—

Table 2: Average percentage of species in mown herbage during the period 16th August, 1938, to 31st August, 1939 (14 cuts).

Treatment.	Perennial Ryegrass.	Cocksfoot.	White Clover	*Other Grasses.	Other Species (mainly weeds).
1. No harrowing ..	70.1	10.9	13.2	5.5	0.3
2. Autumn harrowing	70.7	10.9	12.9	5.3	0.2
3. Autumn and Winter harrowing ..	76.1	7.9	10.5	4.9	0.2
4. Winter harrowing	74.6	7.5	12.6	4.5	0.4

The other grasses were mainly crested dogstail, *poa pratensis*, brown top, sweet vernal, yorkshire fog, *poa trivialis*.

Harrowing has had little effect on the botanical composition of the sward. Winter harrowing (Treatments 3 and 4) may have slightly raised the percentage of perennial ryegrass and lowered that of cocksfoot, but the effect is really negligible. It is interesting to note that the weed content has not increased as a result of the harrowing treatment given. The danger of this happening in some instances, however, cannot be overlooked.

Weighing and sampling the herbage.

Summary

1. Drastic harrowing of a highly-productive sward under sheep grazing at Marton gave no improvement either in seasonal production or in the total yields of herbage over a five-year period.

2. It is pointed out that this result does not necessarily apply in cases where a "sod-bound" sward (such as one of paspalum) is harrowed, or where intensive grazing by dairy stock is practised. Further work is needed before the effect is shown of severe harrowing on pasture production under these conditions, but practical considerations would suggest that there are several occasions where drastic treatment of the sward would be sound farming practice.

3. Little changes in the percentage of species present in the mown herbage resulted from any of the harrowing treatments.

Acknowledgments

The painstaking manner in which Mr. W. B. Wards, Overseer at the Marton Experimental Area, has conducted the trial, is deeply appreciated. Thanks are also due to the Grasslands Division, Palmerston North, for the numerous botanical analyses of herbage samples, and to their chemist who carried out the dry matter determinations. The donation of a set of "Alfa Anti-Clog Harrows" by the Alfa-Laval-Separator Co. (N.Z.), Ltd., Palmerston North, is also gratefully acknowledged.

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3

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Testing of Purebred Dairy Cows

Review of N.Z. Certificate-of-Record System in 1939

W. M. SINGLETON, Director of the Dairy Division, Wellington.

AN unfavourable spring in 1938 had its effect on both C.O.R. entries and C.O.R. records for the calendar year 1939. Fewer cows were offered for test, while the general standard of production was below the average of recent years, and although some excellent performances were recorded the climatic conditions prevented many cows from doing themselves full justice.

First-class certificates-of-record were issued to 492 cows in 1939, compared with 569 cows in 1938, 434 cows being in the yearly test division and the remaining 58 in the 305-day division, the comparative figures for 1938 being 497 and 72 respectively.

The 435 certificated in the yearly division in 1939 were credited with an average production of 498.96 lb. fat, and the 58 cows in the 305-day division with 436.92 lb. fat. The comparative figures for 1938 were 504.70 and 451.13 lb. fat respectively.

(1) C.O.R. YEARLY TEST DIVISION.

During the 27 years which have elapsed since the start of the C.O.R. test in 1912, first-class certificates in the yearly division have been issued to 11,151 cows. Classified in breeds, there were 8,425 Jerseys, 1,925 Friesians, 497 Milking Shorthorns, 226 Ayrshires, 69 Red Polls, 2 Guernseys, and 8 Shorthorns.

A large number of these cows were tested more than once, and certificates issued during the 27 years total 12,725, Jerseys receiving 9,426, Friesians 2,394, Milking Shorthorns 547, Ayrshires 253, Red Polls 94, Shorthorns 8, and Guernseys 2.

Table 1 provides a numerical summary of yearly certificates of the first-class issued during the past two calendar years:—

Table 1.

Breed	1939			1938		
	Ordinary	Repeat	Total	Ordinary	Repeat	Total
Jersey	337	33	370	406	28	434
Friesian	36	12	48	33	13	46
Milking Shorthorn	15	..	15	15	1	16
Ayrshire	2	..	2	1	..	1
Shorthorn ..	..	..	..	..	..	..
Red Poll ..	..	..	..	..	..	..
Totals ..	390	45	435	455	42	497

Second-Class Certificates Issued.

Second-class certificates were issued to 70 cows during the year under review, 57 being granted to Jerseys, 8 to Friesians, and 5 to Milking Shorthorns. Grouping the cows of each breed into one class, the 57 Jerseys averaged 445.39 lb. fat, the 8 Friesians 577.63 lb. fat, and the 5 Milking Shorthorns 491.13 lb. fat, an average of 463.77 lb. fat for the 70 cows.

"Meon Nehutai," owned by M. N. Trotter, Kati Kati, C.O.R. 14,789.5 lb. milk, 888.20 lb. fat, in 365 days. Highest producing Jersey for 1939.

Period between Calvings.

The average period between calving for commencement of test and calving subsequent to test for the 435 cows granted first-class certificates in the yearly test division in 1939 was 399 days, as compared with 390 days in 1938. The rules governing the testing allow 455 days, so that the average cow calved 34 days after the expiry of the 12 months' testing period, and eight weeks within the time allowed by the rules.

JERSEYS.

Class Leaders.

No records made by cows of the Jersey breed during last year seriously challenged the existing class-leadership performances. Several good yields, however, were recorded. Irrespective of age, the highest producer for the

"Bakoboa Dulcie," owned by Mrs. J. Larsen, Cheltenham. C.O.R. 12,121.8 lb. milk, 735.38 lb. fat, in 365 days. Highest senior two-year-old Jersey for 1939.

year was "Meon Nehutai," who gained a certificate for 888.20 lb. fat in the four-year-old class. Another good record, having regard to age, is that of Mrs. J. Larsen's "Bokaboa Dulcie," who is credited with 735.38 lb. fat as a senior two-year-old.

The present Jersey class leaders are as follows:—

Table 2.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Butter-fat.
		Yrs.dys	lb.		lb.	lb.
Jun. 2-yr-old Beechlands Summer Lass	A. Moreland & Sons, Te Rapa	1 343	275.5	365	15,467.2	899.25
Sen. 2-yr-old Ashvale Dreaming Stella ..	J. & G. W. Dobson, Lepperton	2 350	310.5	365	12,689.1	815.73
3-year-old Ivondale Silver Rainbow	P. J. Petersen, Waitara	3 327	309.7	365	15,073.4	950.63
4-year-old Woodlands Felicie ..	P. J. Petersen Waitara	4 364	384.9	365	17,332.6	1,220.89
Mature Holly Oak's Annie ..	W. T. Williams, Pukehou	5 9	350.0	365	18,522.7	1,056.49

Jersey Class Averages.

In 1939, Jersey cows received 370 certificates in the yearly division, as compared with 434 in 1938. The 370 certificates represented an average production of 498.91 lb. fat, the average for 1938 being 497.58. The averages class by class for 1939 and 1938 are given in Table 3:—

Table 3.

Class.	Number of Cows.	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
1939				
			lb.	lb.
Junior two-year-old ..	116	355	7,593.6	440.75
Senior two-year-old ..	44	352	8,613.1	487.46
Three-year-old	66	350	9,090.1	519.28
Four-year-old	49	350	9,725.0	540.15
Mature	95	351	9,632.3	539.80
1938				
Junior two-year-old ..	154	349	7,698.8	437.34
Senior two-year-old ..	57	342	8,477.5	483.38
Three-year-old	73	349	9,209.9	518.75
Four-year-old	53	344	9,136.0	520.04
Mature	97	342	10,172.2	573.35

The averages, class by class, of all certificates issued to Jersey cows since the start of the C.O.R. test in 1912 are given in Table 4:—

Table 4.

Class.	Number of Certificates	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Junior two-year-old ..	3,730	349	7,324.5	413.78
Senior two-year-old ..	1,022	347	8,003.5	453.63
Three-year-old	1,415	347	8,759.1	491.52
Four-year-old	993	348	9,330.2	522.87
Mature	2,265	347	9,657.2	533.33
All .. .. Average Test: 5.60 p.c.	9,425	348	8,385.4	468.65

"Oakview Keyes Trojan," owned by A. W. Montgomerie, Mangere. C.O.R. 23,753.3 lb. milk, 905.92 lb. fat, in 365 days. Highest first class C.OR. Friesian for 1939.

Jersey C.O.R. Bulls.

The Jersey cows which have received certificates to date are from 3,176 different sires, and of this number 634 have qualified for the C.O.R. bull class, 30 new names having been added during the year. A bull is classed as a C.O.R. bull when he has four or more daughters with first-class certificates, each daughter being from a different dam.

Champion butterfat bulls now total 57, six names having been added to the list during 1939. The qualifications for the champion butterfat bull (C.B.B.) class, which was inaugurated some years ago by the Jersey Cattle Breeders' Association, are as follows:—Each bull must have five or more daughters which under first-class C.O.R. conditions have produced 520 lb. butterfat when starting test up to three years of age, 580 lb. when starting between three and four years of age, 640 lb. when starting between four and five years of age, or 700 lb. when five years old or over. It is not necessary for each daughter to be from a different dam. The corresponding standards for cows in the 305-day test are 460 lb., 510 lb., 560 lb., and 620 lb. butterfat respectively.

"Totara C.R. Parma," tested by Mrs. H. V. Leaning, Cambridge. Second class C.O.R. 27,345.0 lb. milk, 910.18 lb. fat in 365 days. Highest producing Friesian for 1939.

FRIESIANS.

Class Leaders.

There were no changes in Friesian class leaders as the result of the past year's testing. There were, however, some excellent performances by Friesian cows. In the senior three-year-old class "Oakview Keyes Trojan," owned by Mr. A. W. Montgomerie, of Mangere, produced 905.92 lb. fat. This cow holds the junior two-year-old leadership with 836.98 lb. fat. It is therefore obvious that she is an outstanding cow. 'Oakview Keyes Trojan" is again on test and is likely to eclipse her previous records. The highest producer for the year among the Friesians was "Totara C.R. Parma," bred by the Piri Land Company and owned and tested by Mrs. H. V. Leaning of Cambridge. Unfortunately, "Totara C.R. Parma" failed to calve in time to qualify for her first-class certificate, but was granted a second-class C.O.R. for 910.18 lb. fat. She was in the mature class.

The Friesian class leaders are as follows:—

Table 5.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk	Butter-fat.
		Yrs.dys.	lb.		lb.	lb.
Jun. 2-yr-old						
Oakview Keyes Trojan	A. W. Montgomerie, Mangere	2 131	288.6	365	22,146.8	836.98
Sen. 2-yr-old						
Pareora Echo Blossom ..	T. Sheriff, Clandeboye	2 223	262.8	365	22,671.9	819.81
Jun. 3-yr-old						
Monavale Queen Bess	T. H. Richards, Cardiff	3 56	282.6	365	21,609.3	800.18
Sen. 3-yr-old						
Totara C.R. Buttercup ..	Piri Land Co. Auckland	3 247	336.7	365	25,885.3	989.10
Jun. 4-yr-old						
Totara Veeman Lulu ..	Piri Land Co. Auckland	4 12	349.7	365	22,364.2	946.78
Sen. 4-yr-old						
Totara C.R. Buttercup ..	Piri Land Co. Auckland	4 267	375.2	365	27,108.1	1,079.14
Mature						
Alcartra Clothilde Pietje ..	Vernon Marx, Mangatoki	7 355	350.0	365	31,312.5	1,145.24

"Erinview Jest," owned by J. Murray, Woodville. C.O.R. 12,817.4 lb. milk, 742,69 lb. fat in 365 days. Highest producing three-year-old Jersey for 1939.

"Sterling Blonde," owned by J. A. Moffat, Dargaville. C.O.R. 13,461.8 lb. milk, 725.42 lb. fat in 365 days.

Friesian Class Averages.

Certificates issued to Friesian cows in 1939 totalled 48, two more than for 1938. The average production for 1939 was 516.04 lb. fat, while for 1938 it was 563.95 lb. fat. The Friesian class averages for 1939 and 1938 are given in Table 6:—

Table 6.

Class.	Number of Cows.	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
1939				
			lb.	lb.
Junior two-year-old ..	21	343	11,213.0	431.51
Senior two-year-old ..	2	356	15,374.1	528.83
Junior three-year-old ..	4	344	14,453.7	516.88
Senior three-year-old ..	2	358	19,161.9	723.91
Junior four-year-old ..	..	..	..	..
Senior four-year-old ..	2	365	18,744.9	637.79
Mature	17	336	15,621.6	579.99
1938				
Junior two-year-old ..	14	343	14,277.9	510.82
Senior two-year-old ..	5	349	14,140.7	518.05
Junior three-year-old ..	3	332	12,597.9	584.48
Senior three-year-old ..	2	365	16,766.6	616.56
Junior four-year-old ..	4	302	13,914.9	515.39
Senior four-year-old ..	3	330	15,524.9	528.40
Mature	15	354	16,934.4	637.76

The average, class by class, of all certificates issued to Friesian cows since the commencement of the C.O.R. system in 1912 are given in the following table:—

Table 7.

Class.	Number of Certifi-	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Junior two-year-old ..	729	347	12,057.1	429.49
Senior two-year-old ..	292	349	12,918.1	460.66
Junior three-year-old ..	208	344	13,619.0	484.66
Senior three-year-old ..	212	337	14,330.9	515.15
*Junior four-year-old ..	147	344	15,363.2	545.96
Senior four-year-old .	150	346	16,280.9	569.96
Mature	650	343	16,266.1	576.64
All	2,396	345	14,120.8	501.90
Average test: 3.55 p.c.				

* No additions in 1939.

"Ahikouka Pioneer Olga," owned by C. A. Knutson, Dalefield. C.O.R. 15,492.5 lb. milk, 568.87 lb. fat in 365 days. Junior two-year-old.

Friesian C.O.R. Bulls.

The list of Friesian C.O.R. bulls now includes 130 names, two new names having been added during the year. Some 718 sires are represented in the 1,973 Friesian cows (including the 305-day division) certificated to the end of 1939.

MILKING SHORTHORNS.

Class Leaders.

Only 15 Milking Shorthorn cows were tested during the year, and no changes in class-leadership took place. The highest production of the year was made by "Pinedale Stylish Lilac," who gained a certificate in the senior four-year-old class for 617.59 lb. fat. She was owned by Messrs. G. D. Hall & Son, Otorohanga.

The Milking Shorthorn class leaders are as follows:—

Table 8.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Butter-fat.
		Yrs.dys.	lb.		lb.	lb.
Jun. 2-yr-old Matangi Quality 4th	Ranstead Bros., Matangi	2 109	251.4	365	14,572.8	591.89
Sen. 2-yr-old Pinedale Beauty 4th	G. D. Hall & Son, Otorohanga.	2 362	311.7	365	13,273.0	580.62
Jun. 3-yr-old Matangi Quality 4th	Ranstead Bros., Matangi	3 153	292.3	365	16,281.4	678.02
Sen. 3-yr-old Matangi Ruth 2nd	Ranstead Bros., Matangi	3 304	307.4	365	14,032.7	747.86
Jun. 4-yr-old Matangi Matilda 4th	Hon. Mrs. E. J. Blyth, Kohimarama	4 0	313.5	358	14,640.2	630.38
Sen. 4-yr-old Ashley Bank Winsome	Peach Bros., Sefton	4 298	378.3	365	17,687.7	730.93
Mature Glenthorpe Lady	A. J. Melville, Buckland	Mature	350.0	365	20,136.2	856.85

Milking Shorthorn Class Averages.

The average production of the 15 cows of the Milking Shorthorn breed certificated in 1939 was 453.40 lb. fat from 10,988.2 lb. milk in an average milking period of 343 days. The junior two-year-old and senior three-year-old classes were each represented by three cows, only one cow was in the junior four-year-old class, while there were two cows in the senior four-year-olds and six in the mature class. The 16 cows of the Milking Shorthorn breed granted certificates during the previous year yielded an average production of 525.34 lb. fat from 12,486.9 lb. milk in 356 days.

The averages, class by class, of all certificates issued to Milking Shorthorn cows since the start of C.O.R. testing for this breed in 1914 are given in the following table:—

Table 9.

Class.	Number of Certificates	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Junior two-year-old ..	62	350	8,523.1	351.30
Senior two-year-old ..	47	350	9,015.2	375.94
Junior three-year-old ..	30	338	9,772.4	400.98
Senior three-year-old ..	37	342	10,979.5	453.85
Junior four-year-old ..	28	350	11,200.9	461.70
Senior four-year-old ..	39	342	11,577.4	440.04
Mature	304	342	11,892.0	477.44
All	547	344	11,027.2	445.16
Average Test: 4.03 p.c.				

Milking Shorthorn C.O.R. Bulls.

No new names were added during the year to the list of Milking Shorthorn C.O.R. bulls, the number remaining at 18. A total of 176 sires is represented in the 497 cows of this breed certificated to the end of 1939, cows in the 305-day division being included.

AYRSHIRES.

Only two certificates were issued to Ayrshire cows in 1939. There was no change in class leadership. The highest production of the year was 500.39 lb. fat on a record begun at the age of 2 years 31 days, the cow being "Ardgowan Pretty Maid," owned by Mr. F. S. Hutchings of Ngakuru, Rotorua.

"Kiteroa Gamboge Goldie," owned by S. I. Crookes, Auckland. C.O.R. 16,028.1 lb. milk, 856.46 lb. fat in 365 days.

The Ayrshire class leaders are as follows:—

Table 10.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Butter-fat.
		Yrs.dys.	lb.		lb.	lb.
2-year-old Fair Maid of Greenbank	W. Moore, Homebush	2 27	243.2	365	12,281.3	673.56
3-year-old Maesgwyn Victoria	C. Morgan Williams, Kaiapoi	3 250	302.5	365	16,507.7	646.98
4-year-old Ivanhoe Fancy	A. M. Weir, Menzies Ferry	4 308	344.3	365	14,207.7	718.93
Mature Floss of Braeside	W. Moore, Homebush	7 287	350.0	365	20,305.5	832.72

The averages, class by class, for all certificates issued to Ayrshire cows since the start of C.O.R. testing in 1912 are given in the following table:—

Table 11.

Class.	Number of Certificates	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Two-year-old	74	344	8,998.7	373.86
Three-year-old	41	347	10,111.8	416.40*
Four-year-old	27	346	11,378.0	459.52
Mature	111	348	11,914.7	485.26
All .. .. Average Test: 4.09 p.c.	253	347	10,712.3	438.77

* Amended figure.

No Red Polls have been tested during the past two seasons.

(2) C.O.R. 305-DAY TEST DIVISION.

In 1939 first-class certificates in the 305-day division were issued to 58 cows, 54 being granted to Jerseys, 3 to Friesians, and 1 to an Ayrshire. In addition, 7 Jerseys, 1 Friesian, and 2 Ayrshires qualified for second-class certificates in this branch of the C.O.R. test.

"Totara Forest Lass," owned by Piri Land Company, Taupiri. C.O.R. 18,642.9 lb. milk, 722.94 lb. fat in 365 days.

"Longbeach Transvaal Star 11th," owned by J. H. Grigg, Longbeach. C.O.R. 16,744.3 lb milk, 685.83 lb. fat in 281 days. New class leader in the 305-day division mature class.

First-class certificates in the 305-day division, which was introduced in 1930, have now been awarded to 618 cows, of which 560 were Jerseys, 48 Friesians, 4 Milking Shorthorns, 5 Ayrshires, and 1 Red Poll.

JERSEYS.

Class Leaders.

One change in class-leadership took place during the year. In the junior two-year-olds, Mr. W. D. Dron's "Kass Goldie's Promise," with 591.16 lb. fat displaces by the narrow margin of 0.25 lb. fat, Mr. D. Yandle's "Punga Nui Joyce," 590.91 lb. fat. "Kass Goldie's Promise" also gained a certificate in the yearly division for 680.25 lb. fat, which made her the highest junior two-year-old Jersey of the year.

Table 12.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Butter-fat.
		Yrs.dys.	lb.		lb.	lb.
Jun. 2-yr-old Kass Goldie's Promise	W. D. Dron, Nelson	2 31	253.6	305	9,407.5	591.16
Sen. 2-yr-old Ashvale Dreaming Stella	J. & G. W. Dobson, Lepperton	2 350	285.5	305	11,317.8	711.51
3-year-old Pukeroa Wheaten Wafer	F. Geck, Te Kauwhata	3 165	303.5	305	12,853.9	700.76
4-year-old Hatcliffe Lady Gay	H. J. Kaye, Huinga	4 60	329.5	305	10,619.9	664.49
Mature Cyrilla's Twylish Girl	E. J. Clough, Inglewood	11 88	360.0	305	17,645.4	906.15

The production averages according to age class of the 54 first-class certificates issued to cows of the Jersey breed in 1939 are given in Table 13. The average for all the cows was 428.87 lb. fat from 7,784.9 lb. milk in 296 days, the average test being 5.50 per cent.

Table 13.

Class.	Number of Cows.	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Junior two-year-old ..	24	299	6,440.1	366.11
Senior two-year-old ..	1	303	7,886.0	453.05
Three-year-old ..	8	295	9,087.8	497.99
Four-year-old	14	295	8,513.1	456.44
Mature	7	289	9,436.1	506.43

The averages, class by class, of all certificates issued to Jersey cows since the introduction of the 305-day division in 1930 are given in the following table:—

Table 14.

Class.	Number of Certificates	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Junior two-year-old ..	231	299	6,655.3	378.86
Senior two-year-old ..	58	300	8,004.2	436.68
Three-year-old	103	299	8,178.9	453.57
Four-year-old	68	298	8,550.6	479.07
Mature	118	299	9,120.8	496.92
All				
Average Test: 5.57 p.c.	578	299	7,788.5	433.87

"Kass Goldie's Promise," owned by W. D. Dron, Richmond, Nelson. C.O.R. 9,407.5 lb. milk, 591.16 lb. fat in 305 days. New class leader in the 305-day division. Junior two-year-old Jerseys

FRIESIANS.

Class Leaders.

Only three Friesians gained certificates in this division during the year, but two of them exceeded the previous class leadership records. "Fairburn Lady Taureau," with 592.17 lb. fat, and owned by Mr. W. C. Miller, Motukarara, Canterbury, becomes leader of the senior four-year-olds, while "Longbeach Transvaal Star 11th," with 685.83 lb. fat, and also a Canterbury cow, being owned by Mr. J. H Grigg of Longbeach. is the new leader in the mature class. Both cows have raised the leadership record by a considerable margin, the previous senior four-year-old leader being "Ellerlea Aaggie Segis Minto" with 557.71 lb. fat, and the previous mature leader "Ellerlea Egie Segis Minto" with 650.85 lb. fat. Both these cows were owned by Mr. C. H. Steadman, of Pokapu, North Auckland.

The list of Friesian class leaders is as follows:—

Table 15.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Butter-fat.
		Yrs.dys.	lb.		lb.	lb.
Jun. 2-yr-old Sealands Magpie Pietertje 2nd	H. G. A. Cameron, Weraroa	2 22	252.7	305	11,727.4	454.16
Sen. 2-yr-old Rosevale Beauty Posch Griselda	E. H. Watson, Windsor	2 216	272.1	305	12,273.5	468.50
Jun. 3-yr-old Totara De Kol Nina	Piri Land Co. Auckland	3 117	298.7	305	16,005.9	501.37
Sen. 3-yr-old Paepaetahi Jewel	A. F. Perkins, Taradale	3 354	322.4	305	12,342.7	529.94
Jun. 4-yr-old Fairburn Princess Pauline	H. Jarden, Hillsborough	4 6	324.1	263	11,443.1	395.68
Sen. 4-yr-old Fairburn Lady Taureau	W. C. Miller, Motukarara	4 246	348.1	305	14,846.1	592.17
Mature Longbeach Transvaal Star 11th	J. H. Grigg, Ashburton	10 42	360.0	281	16,744.3	685.83

Friesian Class Averages.

The three Friesians which gained certificates during the year were credited with an average production of 557.99 lb. fat from 13,699.0 lb. milk in an average milking period of 293 days.

(*Continued on page 290*)

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Pedigree Sow Records

Contributed by the LIVESTOCK DIVISION.

OF the 78 sows recorded for the quarter ended February 29, 1940, 54 had litters sufficiently good to be included in one of the five grades set out below :—

Grade.	Litter Weight.	
	At 3 Weeks.	At 8 Weeks.
1	120 lb.	360 lb.
2	100 lb.	300 lb.
3	90 lb.	270 lb.
4	80 lb.	240 lb.
5	70 lb.	210 lb.

THE following table sets out the performance of each breed as an average for all sows recorded during the quarter :—

Averages.

Breed.	No. of Sows.	No. of Pigs per Litter.		Litter Weight at		Weight per Piglet	
		Born.	Weaned.	3 weeks.	8 weeks.	3 weeks.	8 weeks.
Berkshire ..	28	8.8	7.5	86.4	286.4	11.5	38.7
Large Black ..	6	9.2	7.8	90.8	279.7	11.6	35.8
Large White ..	10	10.4	7.9	96.3	322.5	12.2	40.8
Tamworth ..	34	9.6	7.8	91.2	297.4	11.6	38.1

In the following list the owner's name and address are given, followed by the herd book numbers of the sire and sow, the weights at three and eight weeks, the number of pigs born and weaned, and the grade of the litter.

Berkshires.

Owner's Name and Address.	Herd Book No. of—		Litter Weight (lb.)		No. of Pigs		
	Sire.	Dam.	3 weeks.	8 weeks.	Born	Weaned	Grade of Litter
Bliss, E. T., Parkvale, Carterton	15057	12982	58	193	4	4	—
Burmeister, O. P., Kairanga R.D., Palmerston North ..	12859	11671	119	376	10	9	2
Burmeister, O. P., Kairanga R.D., Palmerston North ..	12859	13989	46	166	6	4	—
Burmeister, O. P., Kairanga R.D., Palmerston North ..	12859	13206	78	258	9	7	5
Ellerm, O. C., Sanson, R.D., Palmerston North ..	13404	14082	129	518	11	11	1
Ellerm, O. C., Sanson, R.D., Palmerston North ..	14949	12708	133	488	13	11	1
Hastings Pig Club, c/o. R. Smith, St. George's Rd., Hastings	15276	15306	70	265	7	7	5
Hicks Bay Pig Club, c/o. L. T. Hughes, Hicks Bay ..	13156	12622	92	273	10	6	3
Hunua Pig Club, c/o. A. M. Stewart, Hunua ..	13577	14447	71	275	7	7	5
Kaitaia Pig Club, c/o. W. J. Bell, Kaitaia	13405	12790	68	252	7	7	—
Kirkland, W., "Elmgrove," Mosgiel	13482	10875	52	126	7	5	—
Kirkland, W., "Elmgrove," Mosgiel	13482	13180	106	294	9	8	3
Larkin, W. T., Rotomanu, Otira Line, West Coast ..	14690	14931	85	219	7	7	5
MacIndoe, C. G., Te Matai Rd., Te Puke	13443	12198	115	349	9	8	2
Manutuke Pig Club, c/o. R. K. Hepburn, Manutuke, via Gisborne	14391	15329	70	296	7	7	5
Maramarua Pig Club, c/o. S. J. Holloway, Maramarua	14604	13048	110	299	13	8	3
Matakana Pig Club, c/o. I. Wilson, Matakana ..	11371	12793	54	178	7	6	—
Netherton Pig Club, c/o. H. A. Mills, R.D., Paeroa ..	13403	13402	44	179	11	4	—
Kaingaroa Pig Club, c/o. G. A. Morphett, R.D., Kaitaia	13679	13995	93	318	10	10	3
Ohau Pig Club c/o. W. R. B. Evans, Buller Road, Levin	13481	13207	68	186	9	7	—
Pitcaithly, R., Mata, Eltham	14652	14333	129	477	11	11	1
Rotomanu Pig Club, c/o. H. E. Hodgkinson, Rotomanu, Westland	14690	12798	129	321	13	10	2
Ruatoria Pig Club, c/o. C. Wilson, Takamore, Ruatoria	13156	14454	95	336	9	8	3
Takahue Pig Club, c/o. W. S. Masters, Takahue ..	13405	14195	107	339	11	11	2
	13405	14099	103	303	8	8	2
Unwin, S., "Stonycroft," Winchester	14019	14497	97	317	8	7	3
Waihi Pig Club, c/o. A. C. Davidson, Tauranga Road Waihi	13024	14234	35	160	5	4	—
Wairau Pig Club, c/o. F. A. Parker, Spring Creek, Marlborough	12917	13670	64	259	9	7	—

Large Blacks.

Horsham Downs Pig Club, c/o. C. G. Haultam, Horsham Downs, Hamilton	2356	2068	65	150	6	6	—
Liggins, J. H. P., Box 6, Tokomaru	2377	1849	138	450	10	10	1
Mangawhero Pig Club, c/o. T. W. Thornton, P.O. Box 3, Matamata	2289	2223	48	164	9	6	—
Paroa Pig Club, c/o. E. R. Hunt, James St., Whakatane	1352	1910	123	448	12	11	1
Rotorua Pig Club, c/o. D. Bray, P.O. Box 161, Rotorua	2271	1654	103	247	8	7	4
Tahuna Pig Club, c/o. F. B. Whitechurch, P.B., Morrinsville	1861	1721	75	219	10	7	5

Large Whites.

Barrytown-Punakaika Pig Club, c/o. A. T. Richards, Barrytown, Greymouth	5155	4874	115	377	12	10	2
	5155	5141	103	359	13	10	2
Fullerton, W. J. Kutarere, Bay of Plenty	4744	5175	119	409	11	9	2
Keiller, B. E., Box 272, Palmerston North	5108	5000	130	371	9	9	1
Keiller, B. E., Box 272, Palmerston North	5119	5107	86	359	7	7	4

Owner's Name and Address.	Herd Book No. of—		Litter Weight (lb.)		No. of Pigs.		
	Sire.	Dam.	3 weeks.	8 weeks.	Born.	Weaned.	Grade of Litter.
Large Whites (Continued.)							
Keiller, B. E., Box 272, Palmerston North	4659	4667	86	271	9	7	4
Norsewood Pig Club, c/o. Mrs. M. E. Jenkins, Norsewood	5119	4860	120	435	13	10	1
Paerata Pig Club, c/o. A. R. Dunning, Grey Street, Pukekohe	4022	4905	57	168	10	6	—
Rowlands, T. E. Ruthin, R.M.D., Kaiapoi	4548	4814	104	320	7	7	2
Te Puke Pig Club, c/o. K. Bowen, R.D., Te Puke	4897	4954	43	156	13	4	—
Tamworths.							
Ararimu Pig Club, c/o. I. L. Chamberlain, Ararimu	11202	10885	114	405	11	10	2
Awakino Point Pig Club, c/o. J. Williams, Awakino Point, Dargaville	9780	8540	48	174	14	6	—
Birdling, G. C. L., "Alfadale," Orari	8252	11190	108	396	8	8	2
Boyle, A. D., Orari, South Canterbury	11182	11091	66	235	6	6	—
Boyle, A. D., Orari, South Canterbury	11182	11092	90	320	10	10	3
Frew, Mr., Awanui	8824	9360	109	420	11	11	2
Gulliver, J. A. V., R.D., Te Puke	9142	10124	89	292	8	8	4
Hamilton, C. J. Manutuke, Gisborne	10451	8421	45	183	6	5	—
Hayes, J. L., Kaeo	13680 (Berkshire)	10600	72	186	10	7	—
Kirkland, W., "Elmgrove," Mosgiel	9613	10656	107	282	8	7	3
Knight, Mrs. R., Westmere, Wanganui	10498	10745	111	462	13	13	2
Koiterangi Pig Club, c/o. F. C. Marshall, Kokatahi R.D., Hokitika	10316	10294	114	360	10	10	2
Maramarua Pig Club, c/o. S. J. Holloway, Maramarua	10421	10054	72	206	7	6	—
Maungaturoto Pig Club, c/o. R. Cullen, Maungaturoto	10908	11255	45	151	5	5	—
Motua Pig Club, c/o. P. A. Osborne, Shannon	3328	10140	113	411	10	9	2
Motukarara Pig Club, c/o. T. M. Wheeler, Motukarara	8820	9854	145	321	13	8	2
Moutere Pig Club, c/o. G. Deck, R.M.D., Upper Moutere	8252	11306	75	272	6	6	5
Murchison Pig Club, c/o. R. G. Thomson, Murchison	10856	10317	106	336	10	8	2
Ohau Pig Club, c/o. W. R. B. Evans, Buller Road, Levin	10659	9745	100	288	12	8	3
Pahiatua Pig Club, c/o. M. Hercock, P.O. Box 45 Pahiatua	10880	7859	34	101	4	3	—
Pokeno Pig Club, c/o. K. Munro, Box 3, Pokeno	10837	10734	114	372	12	10	2
Puhoi Pig Club, c/o. C. A. Straka, Waiwera	10631	9892	117	401	10	9	2
Pukekawa Pig Club, c/o. J. L. Lindberg, Pukekawa	10253	10055	53	169	11	5	—
Rainey, A. and J., Flaxton, Canterbury	9994	10053	155	535	10	10	1
Riwaka Pig Club, c/o. O. C. Wilkinson, Motueka	10106	10295	102	282	7	7	3
Rongotea Pig Club, c/o. J. P. Gloyn, Rongotea	5402	10550	119	409	10	9	2
Sadler, N., Box 5, Tolaga Bay	10113	10158	72	290	9	8	5
Simpson, J., Southbridge	8252	9092	152	371	10	10	1
Studholme, M. D., Te Waimate, Waimate	10942	10297	80	267	9	8	4
Te Araroa Pig Club, c/o. M. W. Halliwell, Whakaangiangi	9932	8968	41	112	11	3	—
Tokomaru Pig Club, c/o. N. J. White, Tokomaru	11206	9744	108	398	12	9	2
Waihi Pig Club, c/o. A. C. Davidson, Tauranga Road, Waihi	11030	10733	66	222	11	7	—
Wairau Pig Club, c/o. F. A. Parker, Spring Creek, Marlborough	7643	10296	117	363	10	9	2
Waiuku Pig Club, c/o. W. S. Morrin, Waiuku	10227	9920	62	138	12	7	—

Testing of Purebred Dairy Cows—*Continued from page 288*

The averages, class by class, of all certificates issued to Friesian cows since the introduction of the 305-day division in 1930 are given in the following table:—

Table 16.

Class.	Number of Certificates	Average Yield for Season.		
		Days in Milk.	Milk.	Butter-fat.
			lb.	lb.
Junior two-year-old	20	298	9,979.9	365.97
Senior two-year-old	6	305	10,155.4	373.32
Junior three-year-old	4	298	11,974.5	453.02
Senior three-year-old	4	305	11,502.4	423.39
Junior four-year-old	1	263	11,443.1	395.68
Senior four-year-old	2	305	15,079.0	574.94
Mature	13	295	13,876.1	517.92
All	50	298	11,528.6	426.87
Average Test: 3.70 p.c.				

AYRSHIRES.

One Ayrshire received a first-class C.O.R. in the 305-day division during the year. This was "Greenfields Regina 2nd," owned by Mr. C. E. C. Webb, of Levin. In the mature class she produced 479.66 lb. fat from 9,829.8 lb. milk in 289 days.

Two Ayrshires also received second-class certificates in the 305-day division. One, "Greenbank Tulip," tested by Mr. D. M. Walker, of Waikiekie, produced 437.97 lb. fat in the mature class, and the other, "Mahoe Highland Lady," tested by Messrs. Atkins Bros., Manakau, gained her certificate for 393.90 lb. fat as a four-year-old.

THANKS.

We desire to record once again our appreciation of the courtesy and co-operation rendered by the secretaries of the various breeders' associations connected with the C.O.R. testing.

Census on Wintering of Pigs

Root Crops are the Foundation of Success

M. J. SCOTT, Superintendent of the Pig Industry

HOW many pigs are carried through the winter? The actual figures are surprising and quite informative. To get a kill of one million carcases a year, three-quarters of a million pigs are kept in the peak month (November) and approximately half that number in the slack months, May, June, and July. During the remaining months of the year the number of pigs on hand for slaughter is between five and seven hundred thousand each month. In November pigs on hand use three times as much feed as pigs on hand in June.

Most people have come to the belief that very few pigs are wintered and to the man who has only breeding stock on hand these figures will be incredible. Nevertheless they are correct. Although there is little dairy by-product in winter, feed of some kind equal in amount to almost one-third of that used in the flush period is provided for these wintered pigs.

Does Wintering Pay?

Nearly every dairy farmer has had a shot at wintering pigs and has either been (a) delighted to see them go off as good baconers in November or (b) relieved to get rid of them as stores that had outlived their welcome, or (c) distracted to see them drown in the mud at half-time, or (d) thankful that they died when all the feed was finished.

The first man is satisfied that it paid him to winter pigs but in the absence of comparisons he cannot say how well it did pay. It may have been just a coincidence; abundant summer milk may have made profits that he credited to wintered pigs, or his sows may have had good litters, or he may have had a profitable year anyhow. The man whose pigs died towards the end of winter is quite sure that wintering pigs is a waste of time. So it is when it's done like that. But why do it that way? Others make a success of it and it is worth while knowing what they do if only to disagree with them! Actual experience is a most prized possession, but the doings of others is often informative.

The farmer who is prepared to cultivate root crops has laid the foundation to the successful wintering of pigs. This fact is revealed by the returns on pig production collected last year by the Livestock Division of the Department of Agriculture.

Just on 300 farmers from all over New Zealand sent returns of pig production to the Department of Agriculture last year. All those who wintered many pigs were put in one group, all those who wintered a few pigs were put in another group, and all those who wintered no pigs were put in a third group. There were about one hundred farms in each group, sufficient to remove any effects of seasonal or accidental happenings.

Cash Returns

Those who wintered no pigs produced 34s worth of pig-meat per cow after paying for meals, which were used for pigs at the rate of half a hundredweight per cow milked. No roots were used.

Those who wintered a few pigs, on an average one store for every two cows milked, produced 38s worth of pigs per cow after paying for meals used and crops grown. They grew roots as pig feed at the rate of one acre for every 80 cows milked, and used meals at the rate of three-quarters of a hundredweight per cow milked. Those who wintered many pigs, two stores for every cow milked, produced 52s worth of pigs per cow, after paying for meals bought and crops grown. They grew roots at the rate of one acre for every thirteen cows, and used

Going Places?

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meals at the rate of one and a half hundredweight per cow milked.

Put in another way, the men who wintered no pigs actually produced 41s worth of pig-meat per cow and paid out 7s per cow for purchased feed. The men who wintered many pigs produced 79s worth of pig-meat per cow and paid out 27s per cow for purchased meals and home-grown roots.

Out of every three farmers submitting returns one winters no pigs, and gets the worst results; one winters a few, does it badly, and gets mediocre results; and one winters many pigs and does it well.

During the last ten years there has been a big increase in the number of pigs slaughtered. **The foundation of that increase has been more pigs wintered, or more fundamentally still, the growing of crops for winter pig feed.** There are lots of frills associated with the development of pigs, but the growing of crops is the only solid fact that makes the production of more pigs possible. The gradual narrowing of the price differences between spring and winter stores that took place after 1930 is the strongest evidence that more pigs were being wintered. The high price of spring and summer stores during the last two seasons is evidence of fewer wintered pigs and in keeping with the serious shrinkage of output.

During the expansion period many theories were tried out and cast aside. Much experience has been gained by everyone, but now, looking back over the past, one of the few certainties is that the growing of winter crops for pigs is the corner-stone of expansion. The best cropper at the least expense is the best root to grow.

18½ ACRES UNDER 30 MILES FROM CITY FOR £550
All undulating land, 14 acres in grass, balance fallow. When fully improved will carry 15 cows. 2 roomed bach, cowshed, separator room, large implement shed and workshop, fowl houses. 1½ miles from school. Cream collected. Owner selling account ill health, near offer considered, about £350 CASH.
47 ACRES. Situated less than 30 miles from Auckland on good metal road. All undulating land. House of 3 rooms, kitchenette, elec. lights, elec. stove, washhouse, 4-bail cowshed, elec. power at shed. Price only **£1250** INCLUDING 16 cows, bull, 2 yearling heifers, 3 calves, horse, 2 sows, 2-cow milking plant, separator etc. **£750 CASH**
165 ACRES. Very conveniently situated near North and probably best farm value for sale handy to the city today. Situated on the main road, school bus for children, convenient good township, high school, etc. Level to easy undulating land on front portion rising to hilly land at the back. Good all electric house of 8 rooms, 6-bail cowshed, garage, etc. PRICE JUST REDUCED TO £2000 INCLUDING 3-cow milking plant. £720 CASH, balance Government mortgage. Farm will carry 50 to 60 cows now.
485 ACRE GOING CONCERN ON £700 DEPOSIT.
A splendid partly improved farm situated in the near North. About 250 acres flat, balance undulating, all ploughable. Watered by permanent stream. 6 roomed house, 6-bail cowshed, milking machine, elec. power, water heater, water pump, 2½ miles from station, township, saleyards, etc. School bus passes the gate. This can be developed into a wonderful farm with tremendous stock carrying capacity. PRICE OF £8 PER ACRE INCLUDES 40 dairy cows, 28 yearlings and heifers, 2 farm horses, milking machine, topdresser, harrows, discs, etc. It is seldom that a farm of this character can be had on such a small deposit.
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AUCKLAND : 1-3 Winstone Bldg., Queen St. Phones 43-668 and 45-062.
HELENSVILLE: Phone 13. After hours W. R. Bethune, 278.

Crested Dogstail Seed Production In Southland

CRESTED dogstail (*Cynosurus cristatus*) is adapted primarily to cool moist regions, and this factor no doubt accounts for its prominence in Southland. As the majority of plants are of the annual type, its existence in the sward depends on favourable late summer and autumn conditions for reseeding.

Under dry conditions at this period, and also when sown in competition with perennial ryegrass of truly permanent characteristics (that is, certified seed), it is not likely to increase in the sward. However, when sown with linings of false perennial ryegrass, it may become dominant in association with white clover, and under these conditions provides early and nutritious food of good fattening quality, but unfortunately of low carrying capacity.

Highest Yield

Land dominant in crested dogstail is generally of a sweeter nature than the ordinary run of Southland soil, where the reversion is mainly to pure browntop swards. According to the latest statistical report on agricultural and pastoral production, of the 2795 acres of crested dogstail harvested for seed in New Zealand, Southland harvests 1974 acres. The average yield per acre is also the highest, being 168lb. per acre.

As may be inferred from the above remarks, it is not the usual practice to make pure sowings of crested dogstail with white clover, although occasionally such sowings are made with the object of seed production. In these cases the seeding would usually be from 20lb to 25lb of crested dogstail and 3lb of certified white clover per acre. Generally, however, 2lb to 3lb. of crested dogstail is sown in the ordinary seed mixture of 40lb. to 50lb. of seed per acre.

In the latter cases the area may not be harvested for some years, and even then the paddock may not be specially closed for seed production. In late January, if the paddock justifies the operation, it may be stripped for seed. As a general rule, stripped seed lacks colour, being dark and fully matured, but it germinates well provided the line does not become heated after stripping.

Drying

For drying, stripped seed is often bagged very loosely, the bag sown, and then thrown over the top wire of a fence, the seed hanging on both sides. The bags are turned daily until the seed is thoroughly dry. Another method is to spread the seed thinly on a cover over the grating in a shearing shed, turning the seed daily.

Where the paddock warrants it, harvesting should be performed with the binder. In these cases, generally the paddock has been closed to stock for a period, and an attempt is also made to harvest at the same time old pasture ryegrass. For this reason the paddock is harvested slightly earlier than would be the case if it were stripped, and consequently the crested dogstail is of a better colour, being canary yellow, although not so mature and therefore of lower germination. It is this type of seed that is preferred by the export trade.

In machine-dressing the worst impurity is Yorkshire fog, particularly when this seed is small in size and becomes shelled. Under these conditions it becomes almost impossible to separate this seed from the smaller seeds of dogstail, resulting in a heavy loss.

—A. STUART, Instructor in Agriculture, Invercargill.

Veterinary Notes for the Farmer

Discussions on First-Aid Measures

Contributed by the Livestock Division

Strangles in Horses

STRANGLES in horses occurs at all seasons of the year. Strangles is a febrile disease of young horses characterised by fever, coughing, frequently a nasal discharge which becomes more marked as the disease progresses, and characteristic swelling of the throat and glands situated inside the under jaws of the animal. There is marked debility and loss of appetite, and the animal holds the head in a characteristic manner with the nose poked forward. The glands around the throat may all appear swollen, and the horse may have difficulty in swallowing.

Abscess Formation

After these symptoms have been present for a few days there appears a tendency to abscess formation at one or more points. This tendency should be encouraged, as it is important that the pus forming underneath should be released rather than imprisoned. In order to hasten the abscess stage, hot fomentations, poultices, and counter-irritants are sometimes applied to the region of the throat. Electuaries of molasses and potassium chlorate are frequently placed on the back of the tongue to ease the sore throat and assist in allaying the cough.

Affected animals require nursing and soft, easily-masticated and easily-swallowed food. Bran mashes or mashes of carrots and bran and oatmeal drinks are frequently provided to maintain the strength of the animal. The disease is a debilitating one for young horses, and a long period of convalescence is necessary if complications are to be avoided.

The typical case, as described above, does not require much other than good nursing and careful attention. As many cases, however, are not typical in character, with abscess formation in other sites, or even internally, it is advisable for all owners to consult their nearest veterinary surgeon and be guided by his instructions and treatment.

Regular Inspection

As the breeding of horses has been encouraged during the last few years, owners are advised to attend to young horses at regular intervals to see that the disease does not become neglected.

The disease is infectious and contagious, and may appear through the purchase of a young animal bringing the disease on to a property. If the older horses on the farm have not passed through an attack they are also liable to become affected. Horses may pick up the infection from common watering troughs and feeding boxes, so that strict isolation of an affected horse is necessary to prevent the spread of the trouble. Occasionally, a whole team may contract the disease from a case affecting an unbroken youngster on the farm.

It is considered that any horse which has had an attack of the disease acquires a life-long immunity, but this immunity may be broken down through neglect, poor feeding, or debilitation due to worms or other disease.

The disease must be considered a serious one among horses, as it attacks them in several forms. If neglected, the animal's breathing may be affected for the remainder of its life. Expert opinion, if available, should be made full use of both in the interest of the horse and the owner.

Treament

For the assistance of owners who are unable to obtain expert advice the following information may prove of some value. In order to assist in relieving the sore throat and inability to swallow, an application of embrocation may be applied to the swollen glands in the throat region. The ripening or pointing of an abscess may be hastened by painting the area with liniment of iodine. When the abscess points it may be lanced with a clean knife which has been boiled before use. The abscess is always opened at its lowest and most prominent part in order to provide adequate drainage.

Steaming the head once or twice daily will assist in the removal of the nasal discharge. Eucalyptus or other

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volatile oil may be added to the apparatus used for steaming.

A tablespoonful of an electuary composed of a mixture of equal parts by weight of chlorate of potassium, honey and molasses, placed on the back of the horse's tongue twice daily will assist in relieving and soothing the irritated membrane of the throat, thereby easing the cough.

Foul in Foot in Cattle

FROM time to time farmers report outbreaks of foot-rot among dairy cows, and are puzzled to know why this disease should appear in their herds. Apart from foot-rot due to tall fescue, a primary injury to the feet is necessary to allow the entrance of the germs, which multiply and cause death of the surrounding tissues, thus producing the typical lesions of foot-rot.

When an outbreak of foot-rot occurs in a dairy herd the first thing to do is to find out how the cows are injuring their feet. Crushed metal, barbed wire, broken fascines, teatree stumps, old tins, etc., can all cause those small injuries which allow germs in the stockyard filth to enter the tissues. The injuries in themselves are trivial, and without the germs would be of little account.

Interesting Case

An interesting case came under notice recently. Five cases of foot-rot suddenly occurred in a herd of 120 cows. The holding yard had recently been coated with shingle, and it was suggested that possibly the cows' feet might have been injured as a result of the metalling. The herd was accordingly kept out of the holding yard, but within a week six more cases had developed.

Further investigation showed that some of the cows were in the habit of visiting a rubbish dump in which there were tins, broken glass, etc. This spot was fenced off, but further cases continued to develop. A thorough search was now made of the farm, and the paths used by the herd were carefully followed. The weather was dry, and it was found that the cows drank from a creek which they forded when coming to the milking shed, and that one track passed through a water hole several feet deep just above the ford itself.

Cause Discovered

On investigation, a big coil of frayed wire rope was found in this hole, and after the coil was removed no further cases of foot-rot developed in the herd.

When foot-rot occurs in your herd don't be satisfied until you find out exactly how the cows received those trivial injuries which allow entrance of the bacillus of foot-rot. Prevention is better than cure.

Answers to Correspondents

Sheep Deaths After Dipping

G.H.M. (WANGANUI RIVER):—

I should be obliged if you could supply me with any information as to the cause of certain sheep losses after dipping. These losses we find much heavier when powder dips are used. We always use an arsenical dip, and the trouble starts from a wound which breaks the skin, a dog bite, a cut from the shears, or a puncture from a stick.

The first symptom is lameness of the sheep, not showing until a day or two have passed after dipping. Examination shows a wound of some sort with local inflammation. The swelling increases, until in a few days the sheep does not use the limb. Death ensues within a fortnight as a rule, although we had cases of sheep under treatment living for three weeks.

If the wound is opened up in the early stages the discharge resembles watery blood; later on it becomes more of the nature of a mattery fluid. The sheep seems unable to use the limb even when the wound has been opened up and thoroughly cleaned.

In one case we were treating and which survived for about three weeks, the muscles assumed before death an appearance resembling fibrous horn rather than flesh. There was also an offensive smell from the wounds.

LIVESTOCK DIVISION:—

Deaths under the circumstances very clearly described are most often caused by blood poisoning of some kind, due to the entrance of common germs into such recent wounds. Frequently the organism present is the one causing malignant oedema, its action on the tissues being to cause discolouration of the muscles, with gas formation, and an odour of putrefaction.

The condition is described in this "Journal" for March, 1937, in an article by Mr. C. V. Dayus, M.R.C.V.S., District Superintendent of Livestock Division, Dunedin. Here it was shown that arsenical dips have little or no germ-killing power, and living malignant oedema organisms were recovered from the actual dipping fluid in the bath itself. Usually, however, death from this cause occurs within two to three days of dipping, and the fact that your cases survived up to a fortnight or even three weeks, suggests that either the treatment carried out had delayed death, or the organisms present were of a less virulent species.

Instances have been seen where prompt opening up of the wound and dressing with permanganate of potash solution have been followed by recovery, but this is exceptional.

Preventive measures would lie in the direction of keeping rough or biting dogs away from the yards at dipping time, and also of periodic complete emptying and cleaning out of the dip, and disinfection with a reliable disinfectant. Also, if possible,

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

cleaning up and disinfecting approach yards.

If the trouble is serious, the use of a certain amount of "non-poisonous" fluid dip with the powder could be tried.

Arsenical poisoning may occur where strong arsenical solutions are applied to wounds, but is most unlikely where the arsenic is at dipping strength.

Death of Pigs

S.R.J., Y.O.T.

Would you kindly inform me through the veterinary column the cause of the death of two ten-weeks-old pigs, the symptoms being the same in both cases.

These pigs were quite normal when fed in the evening, but when called for the morning feed seemed to be suffering from paralysis of the legs, being unable to walk more than a few yards at a time. Later in the day they got worse and could not move or turn, lying in a completely paralysed condition until death a few hours later.

These pigs were kept under the very best of conditions, being allowed the run of a big paddock with clean grass and water and a warm dry house.

LIVESTOCK DIVISION:—

It is almost impossible to offer an opinion as to the cause of death of the two pigs aged 10 weeks. The paralysed condition of the pigs described by you does not appear to be the cause of death; it rather appears as a symptom of some other diseased condition which might have been discovered at a post mortem examination.

Paralysis of the limbs appears gradually, the hind quarters being frequently affected first. If no treatment is carried out the trouble may spread to the fore limbs. Paralysis is not the cause of sudden deaths in animals; affected pigs may linger for weeks. In this case one would suspect some acute internal trouble, such as necrotic enteritis (bowel ulcer trouble) or accidental poisoning.

Rupture of Colt

H.M.M. (NGONGOTAHA):—

I have a draught colt foal five months old which is apparently ruptured from birth. One of his testicles is much larger than one of a full-grown horse, and the sac is becoming larger. The other one is quite normal.

I should be glad if your veterinary department would advise me as to what is best to do with the foal.

LIVESTOCK DIVISION:—

From your description it is probable that your colt foal is affected with what is known as a scrotal hernia. This is a rupture at the inguinal canal through which the testicle passes on its way from the abdomen to the scrotal sac. On one side, other abdominal contents besides the testicle may have passed into the sac, thus giving the appearance of a much enlarged testicle. If the swelling is due to a rupture, the swelling may be reduced by pressure of the hand, or, alternately, enlarges if the foal is forced to cough.

The condition must be regarded as serious. If a loop of bowel becomes imprisoned in the sac the animal will be affected with colic and, in all probability, gangrene of the bowel will set in, causing death.

It appears advisable for you to consult your nearest veterinary surgeon with a view to having an operation performed on the foal. The condition is one to be dealt with in a surgical way, and is not likely to be relieved without an operation.

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Spaying a Heifer

V.L.J. (NGARUAWAHIA):—

I would be obliged if you could answer my queries in regard to spaying heifers through the "New Zealand Journal of Agriculture."

What is the most suitable time of the year to spay heifers? Is it done at any time?

Would it be sufficient to stop a heifer breeding to remove only one testicle? I have done some spaying via the back passage. Cows are easy enough, but it is not so easy from my experience to remove both testicles from a heifer. Perhaps it is want of experience. I have the proper instruments. Any information you can give would be much appreciated.

LIVESTOCK DIVISION:—

The operation of spaying is best carried out either in the spring or autumn when the weather is cool and the fly pest is less troublesome. The wounds heal better in the absence of flies. The work may, however, be carried out at any time of the year on specially selected days.

It is necessary to remove both ovaries at the time of spaying. Although it is common to remove the ovaries from the cow or the mare via the vaginal passage, it is not usual to operate upon heifers in this way. The common method of spaying heifers is through an incision in the flank. Owing to the small size of the vagina in heifers the flank method is much more suitable. As you have experience of the operation through the vagina and have all the necessary equipment, the flank operation should not present any serious difficulty.

The usual method of restraint in a strong cow-bail is followed, leaving an operation space over the left flank of the animal. The left flank should be clipped and washed with a strong antiseptic lotion. A vertical incision should be made through the skin of the flank at the site selected for puncture with a trocar and cannula. If the incision is made too far down there is a danger of severing an important artery which is situated there.

The incision should be about four inches long, just sufficient to allow of the entrance of the hand, and should be made with one sweep of the knife. The underlying muscular tissue should not be cut through, but the fibres should be separated by means of the fingers (after thoroughly washing the hand and arm and treating with an antiseptic wash), sufficient to allow the passage of the hand.

In like manner the peritoneum, or lining membrane of the abdomen or belly, should be pierced by the fingers; then the hand and arm should be introduced into the abdominal cavity, and, turning the hand backwards, the horns of the womb should be felt for. These should each be followed up till the termination near the backbone, where the ovary will be found as an oval body of about the size of a walnut, or larger.

Each ovary should be drawn gently between the fingers and thumb to the wound, where it should be removed by torsion forceps or other instrument, using the knife as little as possible to prevent bleeding. On completion of the operation the edges of the muscle wound will naturally approximate without sutures.

Through the skin should be placed one or two stitches, using a packing needle and strong thread, or thin soft twine, all of which should be previously sterilised by boiling, and kept till required in a 2 per cent. solution of lysol or carbolic acid. After suturing the wound it should be covered with an application of Stockholm tar in order to prevent irritation by flies, and the entrance of dirt.

Provided the operation has been carefully performed, and with reasonable antiseptic precautions, no subsequent bad effects need be apprehended.

Blindness in Sheep

S.J.P. (DANNEVIRKE):—

In the last two weeks several of my ewes have gone blind through a film growing over the eye. It has affected sheep only over three years of age, although all have been in the same paddocks, which are in all stages of growth of English and native grasses. Some have recovered, but I would like to know if there is any cure and if the disease is infectious.

LIVESTOCK DIVISION:—

This trouble in the eyes of sheep is quite commonly seen at this time of the year. It would appear to arise in the first place from some irritation of the eyes of the animals, such as might be caused through driving sheep on dusty roads or from the irritation caused by seed heads in the pasture. A greyish or whitish film forms on the anterior surface of the eyeball and may completely cover the eye and render the affected animal totally blind. The condition is known as Ophthalmia.

The disease must be considered infectious and it is advisable to examine the flock carefully and isolate all animals showing any eye lesions. The affected sheep should be placed in a safe level paddock for treatment and to prevent injury from accidents due to the blindness.

Treatment consists of the daily application of an eye lotion prepared by dissolving six grains of zinc sulphate per ounce of distilled water. Any chemist will prepare a bottle of the eye lotion.

If many sheep are to be treated a small clean oil can will be found useful as a mean of instilling the drops on the eyeball as the sheep pass through a race. The head should be held to one side to enable the drops to spread over the eyeball. Although affected sheep may recover without the use of the eye lotion, it is advisable to apply the lotion to hasten recovery and to prevent the spread of the trouble to other sheep.

A periodic inspection of the clean sheep will be necessary to detect any animals in the early stage of the eye trouble.

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Farm Practice and Management

Contributed by Officers of the Fields Division

SEE FOR YOURSELF—

By A. S. NASH,
Instructor in Agriculture
Rangiora

PUBLICATIONS such as the "Journal of Agriculture," field days conducted by officers of the Department, shows, crop competitions, and many other activities in rural life have as a motive the advancement of the primary producer.

In dairying great improvement in the returns per cow has been achieved with herd testing, but the actual testing would be of little value without the calf-marking schemes to aid the dispersal of the progeny of good strains. Articles written by officers of the Fields Division often appear in these pages describing high-producing farms under systems of topdressing, irrigation, or some other special management. Some readers are capable of profiting from the experiences of others, but, to many lay minds, reading is not sufficient; only by seeing can they believe.

Now, more than ever, if production is to be increased, it is essential that only the most efficient methods of farming be employed, and any dissemination of knowledge which will help to bring this about is of great national value.

Field Days

Field days held on outstanding farms are an excellent means of showing to groups of farmers just what can be done by topdressing and the use of good strains of seeds, etc. However, these gatherings contact only small sections of the rural population, and with petrol restrictions and labour problems it may become increasingly difficult to arrange them in the future.

Foreseeing this, I have elicited the help of various farmers in different parts of my territory. Photographs and a short description of some special feature on the farm should stimulate the interest of others in the district. For their part, the farmers have agreed to co-operate by showing and giving further details to those who care to call and SEE FOR THEMSELVES.

The opportunity is there. It rests with the individual then to brush aside any feeling of conservatism and to avail himself of the facilities offered.

Left.—Just south of the overhead bridge at Nonoti—certified mother seed in the foreground. *Right.*—Showing the low-spreading nature of the Montgomery red clover on Mr. G. Gudex's farm at Whiterock.

Cheviot

About five miles south of Cheviot on the main road the railway line is crossed by an overhead bridge at Nonoti, and some fine pastoral land lies in a basin on the left. At the bottom of the hill on Mr. T. Jackman's Waipuna estate are three paddocks worth inspecting. Alongside the road is a pasture sown in 1931 with 1¼ bushels of mother seed certified ryegrass. It yielded 50 bushels of seed in the first harvest, now has a good mixture of clovers, and is still a dense sward. Palatability has never been any trouble here.

Behind this are 14 acres of Montgomery red clover sown in the spring of 1937 and grazed last year until the first week in November. It was then shut for seed, and yielded 2½ bags of certified seed per acre. The nett return from the 14 acres was more than £400. In addition, grazing was obtained in the previous six months. Alongside the ryegrass is a good field of ten acres of lucerne. Mr. Jackman says: "This is a very profitable corner of my farm."

Loburn

In the foothills behind Loburn at Whiterock, Mr. G. Gudex is farming on clay downs, and he is a keen advocate of liming together with good strains of pasture plants. He started a few years ago with three acres of Montgomery red clover, and he has had several harvests of seed from it. This seed has been used in his pasture mixtures, and some surplus has been sold as certified. His comments on it are that it is the best type of clover he has come across for his type of soil, and he is willing to show anybody around.

(To be continued.)

—A. S. NASH, Instructor in Agriculture, Rangiora.

Growing of Blue Lupins

In answer to an inquiry from Onga Onga on the growing of blue lupins, on clay land, the Wellington Superintendent of the Fields Division (Mr. C. J. Hamblyn) writes:—

Blue lupins are used more in Canterbury and parts of Southland than elsewhere in New Zealand. A number of farmers in both Southland and Canterbury have grown blue lupins as part of the farm crops for upwards of ten years. The lupins are grown for three purposes: (1) As a green manuring and soil improvement crop on light soils or on heavy clay soils; (2) as a seed crop; (3) as a green fodder crop.

It will be best to give some information on each of these three uses for blue lupins.

(1) *For Green Manuring and Soil Improvement.*—The lupin is an excellent soil improver both when fed off and when ploughed in as a green crop. It will give a satisfactory crop on the more difficult type of soil such as poor clays and light dry soils. The growth in the early stages is very slow, the plants taking three or four months to get going. In the later stages growth is quite rapid as the plants shoot up to flower. For ploughing in the lupin is best left to the full flowering stage, when a drag chain is necessary behind the plough to help cover the green material.

For green manuring the lupin can be sown both in the spring and the autumn. When partially grown the lupin will stand quite heavy frosts. Sown in the autumn in March and April, the lupin is ready for ploughing-in in the spring. When spring sown in August, September, or October, the lupin can be ploughed under during the summer or early autumn.

The lupin enriches the soil to a considerable extent, particularly in nitrogen and also improves the texture.

For green manuring the seeding should be at the rate of 2-2½ bushels

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per acre sown through every coulter of the drill with 3-4cwt. of superphosphate and lime mixture.

(2) *As a Seed Crop.*—The lupin can be harvested as a seed crop when either autumn or spring sown. The harvesting is done with the binder or the mower. In the latter case care is essential in handling the swathes. Lupin is a tricky crop to harvest for seed, being very subject in shaking and loss of seed in handling. Yields range from 15 bushels to as high as 40-50 bushels under ideal conditions. When harvested as a seed crop it will be found that the lupins have appreciably improved the soil of the paddock. For seed 1½-2 bushels is sown through alternate coulters.

(3) *As a Green Feed.*—Blue lupins are seldow grown or fed off by themselves as green feed. The plant or portions of it, is very unpalatable, but sheep get accustomed to the taste of the plant and when used to it take to it readily.

Lupins are sown with Italian rye in the early autumn as a winter forage crop in place of swedes or turnips. Lupins are also sown with rape, turnips, and oats for late summer and autumn feed.

From 1 to 1½ bushels of lupin are sown with the usual seeding for the accompanying crop when lupins are sown with rape or turnips. About 1-1½ bushels of oats or 20-25lb. of Italian rye are used when the lupin is sown with these.

When sowing lupins with rape or turnips it is usual to sow the lupins in every other coulter and the rape or turnips through the remaining coulters.

Lupins are also frequently drilled in at the rate of 1-1½ bushels when grass seed is sown. The grass seed being broadcast after drilling, the lupins, on light soils subject to washing and wind blowing the lupins serve a double purpose. They shelter the young grass, bind the soil, and at the same time supply nitrogen to the grass.

Lupins with rape and turnips and also lupins with grass have been successfully used for fattening lambs and ewes, the lupins adding a considerable bulk to the feed produced. Reports and experience as to any poisoning effect of lupins vary considerably. It is stated that a run-off on to a grass paddock is very advisable. It is generally considered that lupins are safe to feed as part of another crop at any stage of growth, the feeding being done when the accompanying crop is ready.

The blue lupin can be recommended as an excellent soil improver, a certain cropper under difficult conditions, and quite suitable for feeding off. It can also be recommended as a cover crop for new grass on light or very heavy soils where additional nitrogen or shelter is required.

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Construction of a Cattle Stop

AT some part of the farm, whether it be at the entrance to the homestead or through paddocks normally traversed by pneumatic-wheeled traffic, an efficient cattle stop can obviate the otherwise irksome duty of opening and shutting gates, and also the possibility of gates being left open and stock straying. Nevertheless, a cattle stop is suitable only for rubber-tyred vehicles; a separate gateway must be provided for heavy vehicles, farm implements, and animals.

The most important constructional features to bear in mind are the durability and strength of the building materials (this is particularly applicable if timber is used), sufficient width and length, and lastly, ample depth beneath the bearers to deter animals from attempting to jump the gap.

Short Courses For Farmers

Tentative arrangements have been made for short courses for farmers in the Auckland district as follows:—

June 10-14: Young Farmers' Clubs at Whangarei.

June 13-17: Young Farmers' Clubs at Pukekohe.

June 24-28: Dairy Farming Course at Ruakura.

July 1-5: Farm Management Course at Ruakura.

July 8-12: Course for Maori Farmers at Ruakura.

Full details will appear in the May "Journal," and further information can be obtained from the Fields Superintendent, Department of Agriculture, Hamilton.

For Durability

For all-round durability and ability to bear heavy weights either light railway rails or, more preferably, 2½ in. galvanised water piping set in reinforced concrete is ideal. When using rails or pipes it is wise to space them no closer than 4 inches, with the rails themselves supported on two bearers spaced about 5 feet apart and in such position that they will bear the weight of the load.

Pipes may be held in position over concrete bearers by pieces of reinforcing steel rod bent over and embedded on either side in the concrete. If this is done the pipe ends should be embedded in concrete to keep them firm. A better plan still is to embed the pipes completely both at the ends and where they pass over the bearers, in which case the concrete surface should be moulded over to prevent animals gaining foothold.

Serviceable Type

The cattle stop in the illustrations, which is a serviceable wooden type, has the following dimensions and constructional details:—

Overall width of bearers	9 feet
Length of cattle stop	10 feet
Depth of ground floor	2 feet

The general appearance of the finished stop is as in Fig. 1. Fig. 2 is a close-up of the rails and supports. The rails are 6 in. x 4 in. hardwood, on edge, and bevelled at road surface. These rest on four beams, also of hardwood, 8 in. deep and 6½ in. wide. The four outer walls of the cattle stop have been built of reinforced concrete, the sides of which are 6 in. through and the ends 8 in. at ground level, with a 4-inch ledge to support at either end the 4-8 inch x 6½-inch bearers.

In this particular stop the cross rails were separated by wooden blocks having a width of 4¾ in. spiked to the bearers beneath, and set 2 in. below the level of the rails. As shown in Fig. 1, the stop has been neatly finished with guard rails on either side of the driveway. To extend the life of the wooden rails they could be brushed over with a creosote mixture.

—D. M. E. MERRY, Instructor in Agriculture, Nelson.

Feeding That Barley To The Pigs

— By —
M. J. SCOTT,
Superintendent of the Pig Industry,
Wellington

JUDGING by the number of enquiries received, there are a number of people who have had little experience of feeding barley to pigs. On that account the field is very ripe for supposition, wrong conclusions, and the very strong opinions of the uninformed that rapidly amount to prejudice when first experiences are unfortunate.

There is probably no aspect of grain feeding that has received more attention, particularly in U.S.A., than the ways in which grain should be fed. Henry and Morrison, the best known American writers on the subject, comment as follows:—

"Crushed or ground barley is approximately ten to seventeen per cent. more valuable than whole dry grain; boiled or soaked barley is six to seven per cent. more valuable than the whole dry grain"

This, presumably, is for old pigs greater than 150 lb. live-weight, for in another place they say for pigs of less than 150 lb. live-weight no advantage is obtained from grinding, crushing, boiling or soaking.

Little Advantage

If crushing or grinding improves barley only by ten to seventeen per cent. it follows that the cost of crushing cannot be more than 5d. to 8d. per bushel. It also follows equally logically that the user gets very little better nett returns from crushed barley than he does from whole barley which costs 6d. a bushel less. Thus, on a reasoned basis there is little advantage to the user in buying ground barley at the higher price. Where it can be ground on the farm, grinding is well worth while. Don't grind it too fine. It is best as a coarse meal showing plenty of husk. Husk is not digested, however finely ground it is.

If ground barley had to bear only the increase due to actual grinding the prospect would not be so bad, but there is another aspect of buying ground barley! Barley can be ground cheaply only when large quantities are dealt with. This means that ground barley has to pay in-and-out-of-store charges, storage and wastage. A merchant who grinds 500 sacks takes a risk of having to store it for some time, and must increase his charges accordingly.

While the actual grinding may be done for 4d. a bushel, an increase in price of something like 9d. per bushel will have to be incurred to meet all extra charges. Farmers will thus be paying very dearly for the convenience and satisfaction of using ground barley, and if they insist on having it crushed they will convert a reasonably cheap feed supply into a relatively dear one. It is a point worth considering.

Merchants will certainly supply the ground barley if it is asked for, but are you helping yourself by asking for it? Instead of being ground, barley can be soaked or steeped until the kernels are soft, and in this way it is made nearly as good as ground barley. A couple of drums or cans are required, and very little extra labour is involved in the process.

Common-sense Principles

Consideration of the following common-sense principles will help many to get better results from barley and meal generally:—

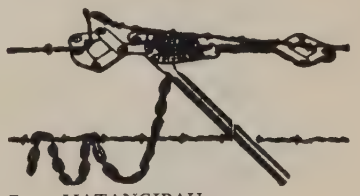
(1) When animals are fed so that they will grow or produce quicker than nature meant them, any grain in the ration will not be completely digested. When the animal is fed at slightly below normal growth rate, grain is usually completely digested. Hence, don't force pigs which are getting grain in the same way as you do when you are topping them off on skim-milk alone. They might take a week longer, but they will grade all the better for growing slower and show a return for the grain.

(2) When animals have to compete for their feed, and eat it quickly to get their share, either through hunger or insufficient trough room, grain will not be chewed and some will pass through undigested. Hence, feed grain after the pigs have cleaned up all their milk; they won't be quite so ravenous. Have plenty of trough room, or spill on the ground in a thin line or in numerous half-handful heaps, so that the pigs can pick up only a few grains at a time. Unless the ground is very wet they won't waste much of it.

Pigs Must Eat Slowly

If you do feed it in a trough, use a trough with a wide, flat bottom from which only a few grains can be picked up at a time. In a V-shaped trough the pig can get a mouthful at a time and bolts the lot. If you have a self-feeder put the daily ration in it and screw it down so that the pigs can lick out only a little at a time. Do anything that makes the pigs eat it slowly; that is far cheaper than using ground barley.

HAYES' AUTOMATIC
(SMOOTH GRIP)
WIRE STRAINER
FOR BARB OR PLAIN WIRE.



From MATANGIRAU,
North Auckland :

Dear Sirs,—I received the Grab Strainer and have used it for straining at the post and for splicing broken wires. I have used most kinds of strainers but consider Hayes' Strainer the best of the lot.

(Sgd.) FRANK GERRING.

Strainer is fitted with a 4ft. chain, and is complete with wire key and directions for use.

Price only 29/6

Stocked by all Merchants.

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Seed Wheat Certification

List of Growers

J. H. CLARIDGE, Seed Certification Officer, Wellington.

FOLLOWING is a list of growers whose wheat crops have passed both the field and the grain inspections required under the Government scheme for the certification of seed wheat. The seed from these crops is not recognised as finally certified until is has been suitably tagged and sealed. An earlier list of growers appeared in the March "Journal."

Variety.	Grower.	Acreage.
Cross 7	Agnew, A. J., Cricklewood, R.D., Fairlie	90
	Armstrong, F. G., Tycho, R.D., Timaru Line A	30
	Armstrong, F. G., Tycho, R.D., Timaru Line B	4
	Brooks, J., Brookside	12
	Carr, J., Mt. Hutt R.D., Rakaia	10
	Casey, J., Claremont	11
	Davison, L. H., Culverden Line C	34
	Davison, L. H., Culverden Line D	30
	Denton, A. E., Domett R.M.D.	3
	Evans, O. G., Hawarden	8
	Foley, J. F., Studholme Junction	11
	Grant, G., Jnr., Hakataramea	6
	Hartnett, T., Rangitira Valley, Temuka	25
	Hellewell, W. T., Enfield 17D, R.D., Oamaru	8
	Hurst, A. C., Papakaio	28
	Jack, J. C., Cave	11
	Jamieson, R. L., Culverden	43
	Marshall, S. A., Tycho R.D., Timaru	13
	McCaw, A. C., Hakataramea	28
	McCaw, F., Hakataramea	150
	McCaw, J. & F., Hakataramea	75
	McEwan, A. Millers Flat	5
	Newlands, G. & A., Incholme	12
	O'Boyle, D., Waitoki, Temuka	40
	Pickering, J. M., Oxford	25
	Rhodes, T. R., Hadlow, Timaru	14
	Sinclair, J. S., Maheno	50
	Smith, L. G., Hadlow Rd., Tycho R.D. Timaru	38
	Smith, W. J. M., Seadown R.D., Timaru	7
	Steven, G. H., Rosewill Tycho R.D. Timaru	20
	Talbot, C. M., Hadlow Rd., Tycho R.D., Timaru	7
	Thatcher, F. J., Orari Bridge, Geraldine	14
	Timblick, C. A., Geraldine	10
	Turpie, P., Tycho R.D., Timaru	31
	Ward, W. J., Ohape, Temuka	6
Hunters II	Bailey, G. E., Flaxton-Kaiapoi R.M.D.	7
	Berry & Halliburton, 28 Dundas St., Christchurch	7
	Bews, J. A., Ngapara 6C, R.D., Oamaru	10
	Bisdee, J. C., Temuka R.D.	20
	Brown, G. E., Kaiapoi	8
	Candy, G. F., Upper Plains, Masterton	14
	Evans, H., Upper Plains, Masterton	12
	Gill, H. R., Rosewill, Tycho R.D.	20
	Haselden, W., Seadown R.D., Line A	11
	Haselden, W., Seadown R.D., Line B	10
	Haselden, W., Seadown R.D., Line C	9
	Henderson, H. J., Hook R.M.D., Timaru	38
	Kuegler, F. W., Waimate, Line A	18
	Mackie, W. A., Seadown, Temuka, Line A	12
	Mackie, W. A., Seadown, Temuka, Line B	4
	Mackie, W. A., Seadown, Temuka, Line C	5
	Marshall, W. J., Tycho R.D., Timaru	20
	McKeown, W. J., St. Andrews	21
	McSweeney, T. M., Adair R.D., Timaru	23
	Parke, S. J., Clandeboye	9
	Paton, R., Papakaio	19
	Southey, A. P. & Son, Masterton	7
	Stevenson, J., Est. of, Flaxton-Kaiapoi R.M.D.	12
Solid Straw Tuscan	Addis, W. R., Culverden	33
	Brosnahan, T. W., Arrowhenua, Temuka	4
	Bruce Bros., Hororata	39
	Hartnett, T., Rangitira Valley, Temuka	10
	Kennedy, T., Georgetown 12K, R.D., Oamaru	38
	Marshall, W. G., 112 West Belt, Ashburton	19
	McCarthy, E., Prebbleton, Line A	28
	McCarthy, E., Prebbleton, Line B	15
	McCarthy, E., Prebbleton, Line C	11
	Mounsey, J., Waikari, Line A	22
	Mounsey, J., Waikari, Line B	20
	Orr, J. S., Timaru-Seadown, R.D.	12
	Talbot, C.M., Hadlow Rd., Tycho R.D.	34
	Vetta, C. G., North Loburn R.M.D.	8
	Watson, P. A., Methven	30
Tainui	Field, R. L., Greytown	2½
	Gee, W. H., Middle Rd., Blenheim	5
	Gresham, J., c/o. C.F.C.A., Geraldine	4
	Leash, A. M., Methven	5
	Johnston, I., Eiffelton R.D., Ashburton	7
	Maindonald, C. E., Box 10, Fairlie	8
	Mowat, J. H., Totara Valley, Pleasant Point	3
	Neave, H., Box 20, Leeston	10
	Stephens, H. G., Irwell	18
	Stevenson, G., Weston	16
	Webb, W., Pleasant Valley, Geraldine	10
	Welch, P. R., Upper Plain, Masterton	8
Dreadnought	Anderson, J., Herbert	15
	Lee, G. W. C., Teschmakers	7
	Medlicott, S., Hook, Waimate	23
	Newlands, J., Incholme. Sec. 11a R.D., Oamaru	16
	Perry, T. Totara	25
	Presland, R., Enfield	4
	Richardson, A. C., Waimate-Willowbridge, R.D.	10
	Roberts, G. R., Studholme Rd., Waimate	5
College Hunters	Bowden, J., Greenpark	5
	Crossman, A. D., Milford, Temuka	8
	Miller, P. H., Box 25, Fairlie	8
	Neave, H., Box 20, Leeston	10
	Tyson, W. H., Springston R.D.	6
Marquis	Payne, E. A., Amberley	13
Taiaroa	Don, M., Waikakahi R.D., Waimate	11

The Orchard and Vineyard

Contributed by the Horticulture Division

How to Pack Apples in Standard Cases

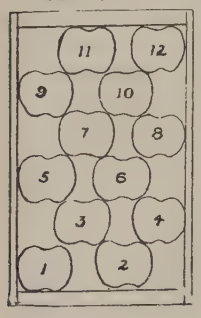
A. T. DOUGLAS, Orchard Instructor, Auckland.

TO pack apples correctly in the Standard Package No. 1, it is highly essential that the fruit should be sorted into sizes as accurately as possible; otherwise the individual fruits will not fit evenly into the pockets of the preceding layers. On no account should the apple of one tier ride the apples of the layer below, because excessive bruising of fruit will occur, especially when the case is packed with the necessary bulge.

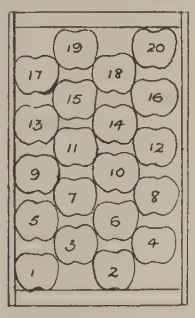
There are three styles of packs generally used. These are commonly known as the 2-2, 3-2, and 3-3 diagonal pocket packs, and will accommodate all apples ranging in size from 3 7-8in to 2 1-8in in diameter.

2-2 Pack

For apples ranging in size from 3 7-8in. to 3in. the 2-2 pack should be used. This pack contains four tiers of apples, and includes the counts from 48 to 96 inclusive. To start this pack, place one apple in the left-hand corner of the box with the calyx towards the packer and the second apple half-way between it and the right-hand corner. The third apple is placed in the space between the first and second apples, and the fourth between the second and side of box (Fig. 1), and the layer is completed with apples in the same relative position. Each of the remaining layers are then completed by placing the apples over the spaces in the under layer.



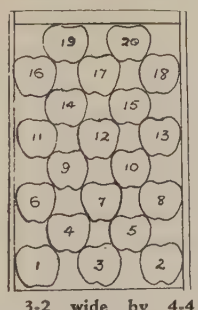
2 - 2 wide by 3 - 3 long; packs 48; 4 layers. Largest of the 2-2 packs. Few apples are larger. Layers laid loose.



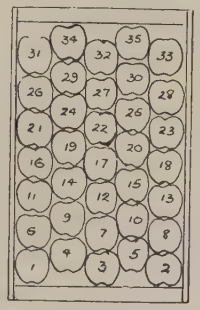
2-2 wide by 5-5 long; packs 80; 4 layers.

3-2 Pack

The 3-2 pack is used for apples ranging in size from 3in. to 2½in. in diameter. There are five tiers in this pack, which covers seven sizes and includes counts from 100 to 175 inclusive.



3-2 wide by 4-4 long; packs 100; 5 layers. Largest of the 3-2 packs; never used for flat apples. Each layer must be laid very loose.

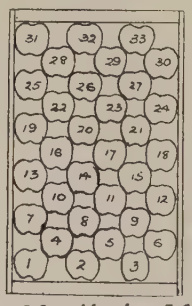


3-2 wide by 7-7 long; packs 175; 5 layers. The layers in pack must be snug.

To begin this pack, an apple is placed in each corner and one in the middle of the end of the case. The next two apples are placed in the spaces created by the first three, and this is followed by three apples and then two alternatively until the layer is completed (Fig. 2). The second layer is started by placing two apples over the spaces in the first layer at the end nearest the packer and continued as outlined for the first layer. The remaining three layers are carried out in the same manner.

3-3 Pack

The 3-3 pack is used for small-sized apples, ranging in size from 2½in. to 2 1-8in. It is started by placing an apple in the left-hand corner of the box and dividing the remaining space with two more apples, leaving a space of equal distance in the opposite corner of the box. The next three apples are placed to fit spaces made by the first three, completing the layer with apples in the same relative position



3-3 wide by 5-6 long; packs 198; 6 layers. Largest of the 3-3 packs. Each layer should be packed loose.

(Fig. 3). The succeeding five layers are packed in the same manner as the first, placing the apples in the pockets provided by the preceding layer.

Every care should be taken to see that the main axis of the apple—that is, the line from stem to calyx—is always kept parallel with length of the case, the stem of the fruit always pointing from the packer. On no account should the apples be placed anglewise.

Orchard Notes

General Maintenance Work

APART from the harvesting of late varieties of apples—work which continues in some instances throughout May and into June—there is little urgent routine work which requires attention during this period. Normally the harvesting work is not so continuous as in the preceding months, and time may be available for giving attention to maintenance work of a general nature and jobs which require doing periodically. It is too early to start pruning, as defoliation is not sufficiently advanced, but time may be well employed by giving attention to drains and shelter belts.

Orchard Drainage

On flat land with insufficient natural drainage improved drainage becomes a matter of first importance if maximum tree development and production is to be secured, as fruit trees suffer severely if the water level is allowed to remain too high for a lengthy period. Exceptionally wet periods from time to time have disclosed weaknesses in a good number of orchards, and have pointed to the need of more drains or deeper drains.

Existing drains require attention by cleaning the open drains and freeing the outlets to covered drains. Trees which have become stagnant in growth or have failed to gain full stature through water injury will make a recovery and renew their growth once the drainage has been made adequate. Roots will penetrate deeper without injury later, and trees will not suffer so much in subsequent dry periods, as is the case when rooting has been kept shallow. It is an advantage to have this work done before the winter rains set in, when land remains wet for relatively longer periods.

Shelter Belts

Although shelter for orchards is very necessary and in most orchard districts some shelter belts have to be provided, it is important that they be kept under control. Excessively tall shelter for relatively small areas may cause excessive shade and keep a wide strip of land excessively dry, resulting in a much greater loss in production than is likely under normal conditions without the full amount of protection. In an area which is too confined conditions are created which favour the development of fungus diseases, particularly powdery mildew of apples.

When Lombardy poplars are used they should be brought down to a reasonable level at regular intervals, as they increase in height so rapidly and have proved very exhausting. They should be brought down to a height of 20ft to 30ft every three years. In order that the work may be spread it is a good plan to undertake a third each year; otherwise an undue amount of time may have to be employed in one year and some other essential maintenance work suffer.

Ploughing and Manuring

Deep ploughing of the orchard at least once a year is advisable, and to gain the most beneficial results it should be done in the late autumn. The action of rain and frost so improves the physical condition of land, especially heavy land and clay soils, that the desirable good tilth early in the spring is more easily attained.

For most orchard lands requiring manures it is necessary to apply a complete ration consisting of materials containing phosphoric acid, potassium, and nitrogen. Phosphoric and potassic fertilisers are best sown before the deepest ploughing, which may be in the autumn, but nitrogenous chemical fertilisers should not be applied until the spring.

Normal applications of fertilisers on the poorer soil types, which constitute a fair proportion of the total fruit area in the Dominion, would be 4 cwt. superphosphate, 2 cwt. sulphate of ammonia, and 1½ cwt. potash per acre, or alternatively, 6 cwt. of blood and bone with the additional potash.

Late Spraying Of Peaches

If opportunity offers it is an advantage to spray peaches with Bordeaux mixture 5-4-50 at "leaf-fall." Some varieties which are recognised as being very subject to leaf curl often require two applications of a fungicide before bud-movement of leaf buds to secure complete control. Broken weather in the spring may make it difficult to spray according to plan. An application at "leaf-fall" will satisfactorily take the place of a spray at "bud-movement" and, having been applied, makes the position more secure in the event of any delay.

Harvesting Late Apples

The main variety of apples still to be harvested is the Sturmer. It provides a very large percentage of the total apple crop, and is grown by almost every apple grower. It will be cool stored to a greater extent than any other variety, and quantities will have to be retained in ordinary storage for a fair period.

Careful handling is essential to secure the best results. Freshly picked Sturmers take on small bruises readily, in addition to grader markings. A space of three or four days between picking and passing over a grading machine allows for just sufficient toughening of the skin to prevent much of the marking which would otherwise occur unless extreme care were employed.

Fruit for long cool storage is best taken from the main picking. It may be necessary to delay delivery of part of the Sturmer crop, in which case the smaller and less mature fruit could, with advantage, remain for a late picking.

Ripe-spot will appear if picking is unduly delayed, but growers should keep the remaining crop under close observation to avoid any damage in this way.

The best possible orchard storage conditions should be provided to prolong the storage life as much as possible and at the same time avoid wilt. Earlier notes have dealt with this aspect of orchard storage.

—N. J. ADAMSON, District Supervisor, Nelson.

Cool Storage Notes

Advantages of Ceiling Cooling System

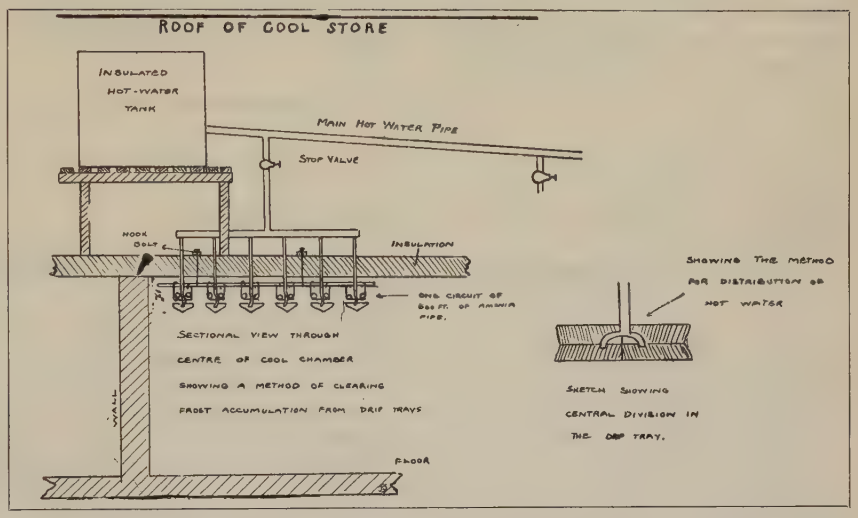
MODERN methods of cooling fruit are following along the lines of cooling the stacks of fruit from ceiling to floor of the cool chambers. When used in cool chambers for the long holding of fruit, this system can be applied by using an improved pipe circuit suspended in flat formation from the ceiling of the chamber, which will increase the cooling efficiency by a more even distribution of the cold air over the surface of the stacked fruit.

Pipe Circuits

The arrangement of the pipe circuits should allow ample space between each pair of pipes for convectional air movement. Drip trays are suspended from the cooling pipes as shown in the accompanying sketch. The drip trays are designed to keep the spaces between each tray as wide as possible in order not to interfere with the convectional air movement throughout the chamber. The trays are constructed from 12 in. 18-gauge flat galvanised iron shaped to 10 in. in width, which is ample to hold the accumulated ice and frost from a plurality of cooling pipes when temperatures of 30 deg. to 32 deg. F. are maintained in the chambers provided the pipes are defrosted at regular intervals.

The problem of removing accumulated frost and ice from the drip trays does not arise unless temperatures lower than 33 deg. F. are to be maintained. When, through lower temperatures, accumulation of frost and ice occurs, heated water is used to clear the drip trays. The method of applying heated water to these trays is shown in the sketch.

The drip trays are drained into box gutters at each end of the cool chamber, which in turn are drained into a sump. A pipe taken through the insulated wall of the chamber fitted with a water trap to the drain pipe serves to convey the water to the drainage system.


ROOF OF COOL STORE
INSULATED HOT-WATER TANK
MAIN HOT WATER PIPE
STOP VALVE
HOOK BOLT
INSULATION
ONE CIRCUIT OF 200 FT. OF AMMONIA PIPE.
SECTIONAL VIEW THROUGH CENTRE OF COOL CHAMBER SHOWING A METHOD OF CLEARING FROST ACCUMULATION FROM DRIP TRAYS
WALL
FLOOR
SHOWING THE METHOD FOR DISTRIBUTION OF HOT WATER
SKETCH SHOWING CENTRAL DIVISION IN THE DRIP TRAY.

The defrosting system for use when temperatures under 33 deg. F. are maintained.

Advantages of System

Conservation of space in cool storage chambers is gained by the ceiling type of installation; maximum refrigeration is obtainable for a given area of premises, thereby providing for requirements of peak periods.

More efficiency of the refrigerating plant is obtained consistent with economy of manufacturing, installation, and maintenance costs.

Excess moisture deposited on the cooling pipes is removed from the cool chamber without loss of time or damage to the stored produce.

By the even distribution of the cooling coils on the ceiling and natural convectional air movement, the relative humidity of the cool chambers is maintained between 85 per cent. and 90 per cent., which is beneficial for the storage of apples and pears.

Seasonal Notes

WHEN stacking different lines of various varieties of apples and pears in cool storage chambers, care should be taken that the stack of each variety is accessible for constant inspection from time to time, as the inspection of fruit in cool storage is essential to detect deterioration in time to avoid heavy losses.

Pears

To ensure long storage life it is highly essential that pears receive proper treatment before they are placed

in cool storage. Long life in cool storage is impossible unless the fruit is harvested at the proper time for the variety, and unless the time that elapses between harvest and storage is reduced to a minimum. Pears, more than any other fruit, are affected by temperature changes, and temperature is the most important single factor relating to their handling. In fact, the storage life of most pears can be practically destroyed by one week of unfavourable temperatures after picking.

Apples

Apples intended for long holding, with the exception of Granny Smith, Ballarat, and Rokewood, should be immediately placed in cool storage when harvested. The three varieties mentioned will improve in condition for long storage if they are held for several weeks in open orchard boxes stacked in a cool, dry place on the orchard before being packed for cool storage.

When holding varieties of apples which have a tendency to break down from fresh collapse or soft scald, such as Sturmer and Jonathan, it is essential that they should be held at temperatures not lower than 36 deg., as this higher storage temperature alone is beneficial in minimising this form of breakdown.

Soft scald on Jonathans will begin to show itself after the middle of May. Flesh collapse develops early in June; therefore, constant inspection of this variety is necessary from the middle of May until the fruit is placed on the market.

Bitter Pit

Varieties which have a tendency to develop bitter pit in cool storage require constant inspection. The large sizes of the fruits of these varieties should be closely examined for the development of bitter pit during storage.

Apples picked from young trees, or light crops, should not be held for long storage, because of the tendency of this fruit to break down early in its cool storage life.

Apples intended for long holding should be selected from orchards which have produced over a number of years fruit that has been held successfully in cool storage.

—A. POWELL, Cool Storage Officer, Wellington.

Citrus Notes

Essentials for Success in Citrus Culture

AT this season of the year, when preparations are being made for the new season's plantings, the essentials for success in citrus culture require to be emphasised. These are:—

(1) An elementary knowledge of the principles of citrus culture, with special reference to the importance of selection of trees, and

(2) A realisation that citrus culture is a long-term occupation, and the preparation of appropriate plans.

Unless an intending planter knows the necessity for the careful selection of variety budwood, rootstock, soil, topography, shelter, etc., initial errors may be made which can never be rectified. A knowledge of spraying, manuring, picking, and other such routine practices can be acquired by experience and by collaboration with the Orchard Instructors of the Department of Agriculture.

Initial Errors

Initial errors, however, in the selection of site, soil, and the quality of trees cannot be altered after planting. Too often a grower realises that his trees are of inferior quality, are on a rootstock unsuitable for the locality, or the topography of his selected orchard area is such that either erosion or drainage will be major problems in the future. A small acreage well managed is better than a larger area poorly managed.

The key to success is crop per acre and per tree. For these reasons, also, waste land on the orchard property should be reduced to a minimum. An average suitable unit is from seven to ten acres on which 400 to 500 trees can be planted with the necessary shelter. If a cow and horses are also to be run the acreage can be extended up to 20 acres, but this extra area should have been already cleared and grassed or it may prove a handicap. Also, in planning the orchard, do not set aside too large an area for residential purposes, as these grounds must be maintained as well as the orchard.

Adequate Finance

A realisation that citrus culture is a long-term occupation refers to the necessity for the intending planter to realise that adequate finance must be available to support the orchard for a period of at least ten years. Too often a purchaser realises the initial costs of land, dwelling, and equipment for maintenance but fails to realise the time lag between time of purchase and the time when the orchard will be a financial asset.

If the soil has not been previously cultivated two years may pass in necessary preparation of soil and establishment of shelter, and then a further five years before the trees begin to bear fruit. After this, a further five years will generally be necessary before the orchard is really self-supporting.

Inadequate attention during these early years either through lack of knowledge or lack of finance means a further postponement of the day when the orchard will reach full bearing, and until that day adequate maintenance of the orchard with inadequate finance will be difficult, if not impossible.

Future Plantings

Therefore, at this season of the year when citrus plantings are being contemplated a realisation of these two main facts requires to be emphasised. Any future plantings should be made on a sound foundation. Consult the local Orchard Instructor before planting your trees, and secure all the information available.

(*Continued on page 310*).

The Home Garden

Small Fruits and Flowers

Vegetables

Selection and Planting of Early Potatoes

F. SYDENHAM, Assistant Horticulturist, Wellington.

THE ideal seed potato or set for the early crop is one which is well-shaped and with deep eyes showing signs of growth. Large sets should be used, as they may be expected to yield a heavier crop than small ones. All sets used should be cut; the large ones from the rose to the stem end, and the small ones, when used, should have a thin slice removed. Such cutting induces early growth of the shoots, and will reveal any signs of disease, as shown in white-skinned varieties by internal colouration. With coloured varieties, internal colour, when of the same colour as the skin, is not a sign of disease. The diseased potatoes should be destroyed. The sets may be cut several days before planting.

The cut sets should be planted 3 in. deep and 12 to 14 in. apart in rows 2 ft. apart. A dressing of artificial manure should be given at time of planting. If the potatoes are planted in a furrow or shallow trench the manure can be concentrated in this, and should produce a better crop than if it were broadcast over the whole area.

Fertiliser

A suitable mixture consists of 6 parts of superphosphate and 1 part each of sulphate of ammonia, sulphate of potash, and blood and bone. On fair quality land under intensive cropping, and where farm manure is not available, 1 lb. of this mixture to 10 to 12 ft. of row is a suitable dressing, but to avoid injury to the sets it should be mixed with the soil.

This amount may appear excessive, but as these potatoes are being grown under unfavourable seasonal conditions, it will be found necessary if a good crop is desired. Amounts greater than this are frequently used in the commercial production of early potatoes. Where farm manure, and especially poultry manure, can be used, or where potatoes are grown on land freshly brought in from grass, the amount of artificial manure may be reduced somewhat.

Where occasional light frosts are likely to occur, it is advisable to grow early potatoes in a situation where the first rays of the rising sun do not strike the plants. If the frost on the plants thaws out slowly the injury will be much reduced or eliminated. If an unexpected frost occurs less damage will be done to the crop if it is sprayed with water or dusted with dry soil or wood ashes before the sun rises. A slight frost attack in the early stages is not serious, and the crop usually recovers, new shoots being put out to replace those that have been cut back.

SEASONAL DON'TS

Don't

neglect to feed plants where winter growth is required. The supplies of phosphate and potash in the soil should be sufficient if previous crops have received generous amounts. The supply of nitrogen is to a large extent made available through the action of nitrifying bacteria, which decompose the humus in the soil. As the season advances and the bacteria become less active the supply of nitrogen becomes insufficient for plant requirements. Much that is produced is lost through leaching. Consequently, occasional small dressings of nitrate of soda should be applied to crops which it is desired should make good growth. As nitrate is not held in the ground, the applications should be small and should be made so that the supply of nitrate may be maintained.

Don't

leave rubbish lying around. Any covering on the ground, whether it be old boxes, sacks or plant growth, will act as a cover under which slugs, snails, slaters and numerous other insects and grubs can find shelter. During the warmer spells of the winter these will come out and will feed voraciously on the leafage of winter crops. Any of this rubbish that will rot should be buried, and the remainder should be burnt. In the absence of suitable shelter, many pests will be destroyed by exposure and the birds will take toll of large numbers.

Garden Layout

Best Use of Area

AT the National Flower Show, held at the Centennial Exhibition on January 30 and 31, the Horticulture Division's exhibit took the form of a model of a layout of two acres of grounds. The exhibit was designed to show that a simple layout could be most effective. A photograph of the model is shown, as also is a sketch plan.

For an effective landscape there is no great need for it to be elaborate. Use can frequently be made of existing features, be they trees, bush, banks, depressions, or slopes.

Frequently the laying down of lawns requires a considerable amount of levelling for, to be most effective on irregular ground, the lawn should be made up of smooth slopes with areas of level ground for sports, etc.

If it is desired that the task of maintaining the lawns be done with the minimum amount of energy and time, there should be few or no breaks in the lawn. Flower beds, and the planting of trees and shrubs, merely make for extra work, and the appearance of the grounds is enhanced when the planting of small objects is chiefly made around the lawn with a background of shrubs and trees and around the dwelling. There are few features more effective than well-cared for and unbroken stretches of lawn.

The Horticulture Division's exhibit at the National Flower Show.
"Evening Post" Photo.

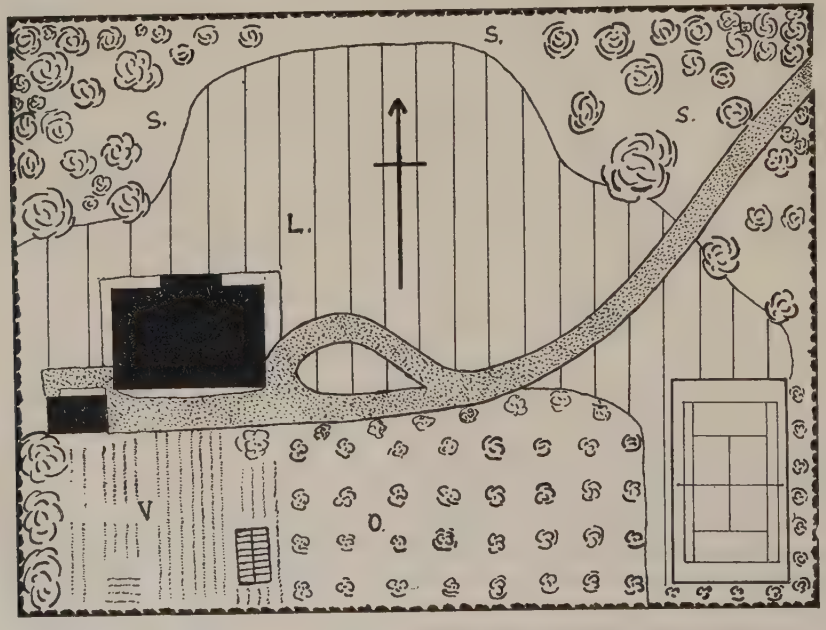
Trees and Hedges

Where the grounds are large, a considerable portion of the area should be devoted to trees. As these mature and resemble bush, a very desirable setting for a dwelling is produced. If the selection of trees for these areas is made with a view to their not casting too dense a shade, there will be situations for planting of subjects which enjoy partial sunlight. Notable among these are hydrangeas and tree ferns. In the more shady portions ferns will be perfectly at home.

In deciding upon what area is to be planted in trees, it must be seen that as they mature they will in no way cut out any desirable view. This planting should also be done with a view to sheltering the dwelling and garden from prevailing winds. It should not, however, be so close to buildings as to shade them unduly from the sun.

There is little need to have trimmed hedges within the grounds. They all make extra work, and if not well cared for they become an unwelcome sight. Their place may well be taken, if desired, by a row made up of a variety of small shrubs. Such a row will afford almost as much shelter as a trimmed hedge.

In country districts it is often advisable to have a stock-proof hedge surrounding the property. Where there is no stock, the hedge may be replaced by flowering shrubs, and even where there is stock, shrubs which they do not attack can be selected for this purpose. A list of these will be found in a classification of shrubs given next month.



A plan of the layout of the exhibit. O, orchard; S, spaces for planting shrubs, perennials and annuals; L, lawn; V, vegetables and small fruits.

Orchard and Vegetables

The orchard, if well planted and maintained, does not require to be placed entirely out of sight. Nor should it be planted where the roots of large trees rob the soil of much of its goodness. It may, however, be screened and partially obscured by a planting of ornamental shrubs or by a trellis of climbing plants.

Like the orchard, the area devoted to the growing of vegetables should be in a position where the roots of large

trees do not make inroads into the fertility of the soil. For convenience, vegetables should be grown as near to the house as is practicable, and should receive full sunlight.

Tennis Court

When a tennis court is included in the layout it should be given a situation where a minimum amount of levelling is required, and where the length of the court runs as near as possible to the north and south, so that the sun as it sets does not interfere with the play at either end. There should be no large trees on the western side of the court to cast a shadow in the late afternoon; nor should the netting round the court be used for the growing of climbing plants for the same reason.

It was with the view of illustrating these simple yet essential points that the Division's model at the Centennial Flower Show was constructed.

Small Fruits

Preparing for Planting

AREAS that are to be planted in small fruits should receive attention as soon as possible. If the area is

How to prune a gooseberry bush.

carrying a cover crop, this should be ploughed under to give it time to rot before the ground is finally prepared for planting. This final preparation need not be fine, but should be thorough so that all weeds are destroyed. The most suitable time to

(*Continued on page 310*).

What to Do in the Vegetable Garden This Month.

Summary of operations for the month (until the middle of May).

SEEDS TO SOW.

Sow broad beans after the end of April. Plant the seeds 3in. deep and 4in. apart in rows 2ft. 6in. apart.

SEEDLINGS TO TRANSPLANT.

Transplant cabbage and cauliflower seedlings.

PERENNIAL CROPS.

Plant the small sets of potato onions. Set them firm and shallow in rows 12in. to 15in. apart, allowing 8in. between the bulbs.

Clean up winter rhubarb beds, and give a dressing of farm manure and superphosphate or blood and bone.

Clean up asparagus beds.

SPECIAL NOTES FOR WARM DISTRICTS.

In districts where frosts are light make a sowing of peas for an early spring picking. This sowing should be made thicker than a spring and summer sowing, as the plants do not make as vigorous growth, and a number die out. The seed should not be sown when the ground is wet from recent rains. W. F. Massey is a suitable variety to sow at this season.

Sow lettuce seed and transplant seedlings of previous sowings.

In well-drained, frost-free districts early potatoes may be planted from the end of April. A note on the selection and planting of early potatoes is given elsewhere in these notes.

CROPS TO HARVEST.

Dig kumaras and potatoes which have not already been taken up.

Sever pumpkins from their vines, and leave them several days in the field to harden before storing.

Pull main crop carrots. Store them in a cool place where the atmosphere is humid. The January-February sowing of carrots will continue to grow, and will not become woody if left in the ground until late in the spring.

GENERAL WORK.

There is not much planting to be done at this season of the year. Much of the ground will be becoming vacant as crops are harvested and used or put into store. As further seed sowing will begin from July and August onwards, a small area will require to remain free of vegetables during the winter. The area available for spring planting will be increased as parsnips, leeks, winter cabbage and spring carrots, etc., are used. The area which will remain free of crops over the winter should be put down to a cover crop.

Clean up and dig or trench any ground immediately crops are harvested.

Collect tomato, bean and pea stakes and store them in a dry place.

On low-lying and poorly-drained areas, temporary drains, approximately one spit of the spade deep, should be dug to carry off surplus water.

By so doing the ground will be made warmer and winter crops will make better growth. The material from the drains, if thrown over the ground before planting, will tend to raise the surface of the ground slightly. The distance apart of the drains will vary with the nature of the soil. If inclined to be wet, they may be spaced 5ft. to 6ft. apart.

Attend to the digging and trenching of heavy soil before wet weather makes these operations impossible.

(CITRUS NOTES — continued from page 306).

On the mature orchard the autumn application of slow-acting phospho-nitrogenous manures, such as blood and bone or fish manure, should be applied at once if this has not yet been done.

The autumn Bordeaux 3-4-50 for the prevention of citrus verrucosis on the young lemons and brown rot on most varieties of citrus should be applied during May.

—A. M. W. GREIG, Citriculturist, Auckland.

Tobacco Notes

Conditioning The Leaf Before Bulking

THROUGHOUT the rush period of harvesting, when all available kilnroom is hurriedly and urgently needed, one of the biggest problems a grower has to face—and often one that causes most annoying and costly delays —is that of getting moisture back into a kiln of leaf after the cure has been completed so that the kiln can be unloaded and the leaf bulked down in the bulking shed.

During an extra dry season this difficulty is magnified considerably. Under such conditions, the usual method of saturating the floors of the kiln with water after it has cooled down and leaving the door and lower ventilators open all night is of no avail. Two nights out of three there is a wind blowing and no dew; consequently whatever moisture is formed in the kiln evaporates before it reaches the first tier of leaf. To attempt this method through the day, when dry conditions prevail, is quite useless.

Steaming the moisture back into the leaf by saturating the floor with water and placing wet sacks on the flue pipes, closing the kiln and raising the temperature to 90 or 95 degrees and keeping at that temperature for several hours is also an unsatisfactory and risky procedure, as the leaf gets either too damp or not damp enough. If too damp, it will mildew in the bulk, often causing serious loss; if too dry, a large percentage of the leaf is broken in the unloading and bulking down operations, again causing loss.

Useful Method

A method adopted by several of the experienced growers both in New Zealand and Australia, and one which goes a long way towards eliminating this problem altogether, is to construct a shed (not necessarily an expensive structure) capable of holding a kiln of leaf. Bush timber can be used for the framework, either old sacks split open and sewn together, or heavy hessian, for the walls, and second-hand sheet iron for the roof.

A convenient size and design of shed is as follows:—Length, 40 ft.; width, 12 ft.; height, 10 ft.; with two triple tiers of racks running the length of either side of the shed, and a loading and unloading passageway down the centre. The width of the pasageway is approximately 3 ft. The height from the ground of the first opposing tier is 4 ft., and there are 3 ft. between the second and third opposing tiers respectively.

This shed must be built in a shaded and sheltered position as close to the kiln and bulk store as possible, and when the weather is too dry to allow the quick reconditioning of a kiln of cured leaf, shut off the heat, open up the kiln, and let it cool off in the usual way.

When the temperature has dropped to about 90 degrees apply a generous quanty of water to the lower walls and floor with a hose or watering can, close door and all ventilators, and leave for three or four hours. Then open up and unload the kiln carefully (as the leaf will still be fairly brittle) into the conditioning shed, having previously given the earth floor a thorough soaking. Within 24 hours at the most it will be found that the leaf has regained sufficient moisture to be handled and bulked down with safety.

—U. A. YELDHAM, Department of Agriculture, Wellington.

SMALL FRUITS — continued from page 309

plant berry bushes is during May. They are practically dormant by that time, and will make root growth to enable them to make a good start in the spring.

The bushes of berry fruits should be pruned from May onwards. If they receive attention after their crops are harvested they will require only a light pruning at this stage. With gooseberries, in addition to this, the main shoot should be cut back by several buds and the side shoots reduced to two buds, as shown in the illustration.

Red and white currants, which also receive summer treatment, should be pruned. The new growth of the leading shoots should be cut back to about 9 in. and the side shoots to two or three buds.

Where summer pruning was not done, the different classes of bushes should be treated as follows:—

Black Currants.—The wood that has borne fruit should be cut back to strong new side growths, if present, or removed entirely, leaving only the young wood which arises from near the ground level.

Gooseberries.—Cut out old and weak wood, and, where growth is dense, thin out the bushes so that more light will be admitted to the plant when in leaf, and so that the fruit will be easier to pick. Follow this with the cutting back suggested above.

Raspberries, Loganberries, and Boysenberries.—Canes which have borne fruit should be cut out entirely, leaving only the new season's wood. The new canes should be thinned out to five or six canes per stool, according to the general vitality of the bed.

APIARY NOTES

Contributed by Officers of the Horticulture Division

Preparations for Wintering the Bees

LITTLE now remains to be done in the apiary except making preparation for the wintering of the bees. As the cold weather will soon be approaching, the bee-keeper should take every care to see that his colonies go into winter quarters in reasonable strength and as comfortable as possible.

Much depends on the care the bees are given during the colder weather if they are to open up in the spring in good condition. It would be useless to expect a weak colony in autumn to survive a very cold winter, and, if it did manage to survive, it would not build up strongly enough to give a good return in the summer.

Unite Weak Colonies

It will be found profitable to unite any weak colonies before they are closed down for the winter. Two or even three weak colonies will often make one good, strong hive, and the added numbers of bees will enable them to conserve the warmth of the hive.

In uniting, it would be well to consider the difference, if any, of the queens. An old queen in one of the colonies is the one to be sacrificed, keeping for preference the younger queens. The method of uniting has been previously explained in last May's issue of this journal.

Leave Plenty Of Stores

The most important preparation in winter is to see that each colony has plenty of honey to keep the bees safe from starvation up to the spring months, when they must then be examined to see how the supplies are lasting. If the bottom box or brood chamber is well filled with frames of honey they should be reasonably safe until spring, but it would be safer to allow them an extra half-super of stores.

Good Combs In Brood Box

Before finally closing down it would be well to give a brief glance through the combs and to remove and replace any defective combs with sound combs of worker cells. It will often be found that certain combs become broken and contain a quantity of drone combs. These should not be tolerated in the brood nest, otherwise an undue proportion of drones will be hatched out in the spring.

The successful bee-keeper tries to keep down the unproductive drones as far as possible, and where all combs are built of worker cells, the hive will be composed of nearly all worker bees, so that more honey will be secured.

Any defective combs which may contain honey can be placed for a while in a super above the mat. If a small corner of the mat is turned back to allow the bees access to the honey they will soon take it down to the combs below.

When these combs are empty they should be removed, and, if suitable, they may be patched as recommended in last May's notes. One good comb can often be made from two or three defective ones.

Beginners should know that the drawn combs are one of the bee-keeper's best assets. A number of good, spare combs in the honey season will make a big difference in the honey crop obtained, for the bees can quickly fill a comb, whereas if they have to use foundation wax, it means a big waste of time in drawing it out into cells.

Winter Feed

As previously advised, when extracting, combs containing dark and unextractable honey should be set aside for winter stores. Any hive found with empty combs should be kept supplied with the reserve combs of honey. The balance of the spare stores should be kept in a dry place which is protected from any danger of robbing by the bees.

If the bottom box has from six to eight combs mostly filled with honey they will not require any further examination until August when, if necessary, additional stores can be given.

Keep Hives Dry

One of the matters that should be attended to just now is to see that all hives are leak-proof so that there will be no danger of the hives becoming damp through wet mats. Nothing is more detrimental to the health and well-being of the colony than continual damp. After heavy rain a brief glance should be given to the mats on top, and any showing signs of dampness should be replaced by dry ones. At the same time, the cause of the wet mats should be ascertained and remedied. A few spare covers should always be in readiness to replace any faulty ones found.

Care of Combs

Where the supers of combs are removed for the winter they should be stored in the apiary buildings with a few carbon balls to keep out the wax moth. In the warmer parts of the Dominion the supers should be examined occasionally, as in these parts the wax moth breeds throughout the year. In the colder parts there is little danger until the spring.

—G. V. WESTBROOKE, Apiary Instructor, Hastings.

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Management of the Laying Pullet

THE season has arrived when the adult birds have practically all ceased laying and are undergoing the process of moult. Full attention should now be given to pullets which were hatched about six months ago as these provide the bulk of the eggs during the winter months. Every assistance should be given them so that they may produce to their maximum capacity. In the first place, every care must be taken to prevent these birds going into a moult.

The very early hatched birds which have been laying for several weeks will generally drop into a moult about this time in spite of anything that is done for them, but with pullets which have only started to lay, or which are on the verge of laying, it is entirely different. Provided they are properly managed they should not moult until next autumn, and will continue producing until that period. However, if they are subjected to improper treatment at this period or in the near future, it is more than likely that they will moult with their elder sisters, and at the expense of the expected winter egg returns.

Changes in Feeding

It is only by careful handling, good housing, good feeding, and close and regular attention to the many details that the poultrykeeper may obtain the best returns from his pullets when eggs are scarce. It is well to remember, where laying pullets are concerned, that sudden changes in the system of feeding are often responsible for retarding production, and very often the cause of them going into a moult. Any contemplated change should be done by degrees.

For a bird to lay out of its natural season, good and liberal feeding is imperative, but protection from climatic extremes, cleanliness, and general common sense management are of equal importance. It is now generally recognised that laying pullets cannot be overfed with the right class of food. They should be allowed as much as they will eat at each meal without waste. Half-starved birds are never profitable, and are generally the first to contract disease.

Useful Hints

Pullets should be graded according to their ages, and should be as uniform as possible. Young stock of various ages, shapes, and sizes running together in the same house never do well.

The pullets should be placed in their permanent quarters some weeks before the laying period begins. This will enable them to settle down and become used to their new surroundings before starting to lay. Overcrowding is a dangerous practice and results in poor body development in young stock. Overcrowding is also generally the forerunner to various ailments, such as colds, roup and many other contagious diseases.

Good housing is essential for the welfare of all classes of stock, and the lean-to type, as illustrated in this Department's Bulletin No. 66 "Utility Poultry-keeping," is generally recognised as the most suitable for New Zealand climatic conditions.

Oyster-shell and gravel grit should be available to the birds at all times. Chopped-up green food, such as young green oats, silver beet, lucerne or

DEPARTMENT OF AGRICULTURE

WALLACEVILLE POULTRY STATION

FOR SALE

COCKERELS of the
WHITE LEGHORN, AUSTRALORP
and LANGSHAN BREEDS.
A limited number only available.

For full particulars apply to—

THE POULTRY OVERSEER,
Animal Research Station, Private Bag to Wallaceville,
Wellington

water cress, should be fed to the birds at least once daily.

Breeding Cockerels

The final selection of cockerels intended for use in the forthcoming breeding season should be made within the next few weeks. Only those birds conforming to breed type and possessing constitutional vigour should be retained.

The importance of using only good quality males in the breeding pen cannot be over-estimated. The male bird is more than half the breeding pen, and he has an influence on the quality of every chick produced. This being so, the intended breeding cockerels should be kept under ideal conditions, and they should receive the very best of care and attention in order to assist them to keep fit.

Many poultry-keepers, after making their final selection of the most promising cockerels, place them in small coops or confined quarters. This is a bad practice, as such conditions do not promote vigour and health, and it also has a tendency to bring about large and unsightly combs. In the building up or maintenance of a heavy laying strain the question of stamina in the males is of supreme importance, and, if good results are to be achieved, every endeavour should be made to assist the birds to retain their stamina throughout the breeding season.

A good method to adopt is to handle the birds periodically and study their condition. If it is found that they are losing weight it is advisable to give them a little extra food. Any cockerels which have breed defects or which are not suitable for breeding should be culled and disposed of for table purposes.

Maintenance of Plant

The next few weeks are generally considered a slack time on most poultry farms. However, this period affords a good opportunity for carrying out repair work to gates, fences, water tins, and feed troughs, making any intended alterations to the plant, or preparing for the coming breeding season. As stock is now at its minimum in numbers, it is a good time to dig up and sow down the runs which are to be used for the young stock throughout their growing stages. It is advisable when turning over the runs to lime them well, as this assists in destroying parasites which may exist. The poultryman who is free of these duties when the busy season arrives is in a far better position to make a success of next season's operations.

Read how it is possible, by looking ahead, to make several shillings extra profit even though birds are moulting.

Tens of thousands of birds will shortly be off lay and hanging in the moult. Not only will they fail to make a profit—they will actually be *eating into the profit* they may have already made, because they will cost their owners good money to feed.

Those poultry-keepers who will be fortunate enough to get eggs from their birds will be in a happy position, and can add several shillings extra profit per head over the coming weeks. How are YOU to remedy matters when your hens are moulting and hardly laying a single egg? The answer is simple. Add Karswood Poultry Spice (containing ground insects) to the mash.

Even if you get only two eggs per bird per week—on 50 hens the weekly value at, say, 2/- per dozen would be 16/8. The cost of Karswood would amount to 1/3, so that approximately 15/- remains to help you hold your PROFIT. Why not place your flock on this world-known poultry tonic to-day? Read these two letters:—

LAID RIGHT THROUGH THE MOULT

"I found your Karswood Poultry Spice very useful in the moulting period for my pullets. They did not go pale in the comb and look very ill like other hens did, before using Karswood Poultry Spice in their mash. They did not stop laying in the moulting period; they were out of the moult and looking as fresh as when they had started four weeks before. I am going to use Karswood Poultry Spice for this year's chicks."—H.H.

8 WEEKS SAVED ON MOULT

"I have been keeping poultry for seven years, and six years I have given Karswood Poultry Spice in the mash during the moulting season and have had eggs. The year that I didn't use your Karswood the fowls were 14 to 16 weeks in the moult. But there was a great change in the ones that had Karswood Poultry Spice, as they were through the moult and laying in eight weeks."—A.M.

(Original letters on file for inspection).

¼D. A DAY FOR EVERY FIVE HENS IS ALL IT COSTS YOU

1/- packet of Karswood supplies 20 hens for 16 days; 2/- packet supplies 40 hens for 16 days; 7lb. tin (12/6) supplies 280 hens for 16 days. Test out a shilling packet.

KARSWOOD POULTRY SPICE

Increases egg-production without forcing, because it contains ground insects, but no cayenne pepper, &c.

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

Omokoroa Club's Concert

THE Omokoroa (Bay of Plenty) Club recently staged a very successful concert in the Te Puna Memorial Hall in aid of club funds. The concert was the Omokoroa Club's first effort of this nature; a very large crowd attended.

The first item was a song by the company, "The Beer Barrel Polka." Five girls sang the verses, with the boys coming in with the barrel, etc., and joining in with the chorus. The feature of the evening was a play, "The Old Geyser," which was excellently performed.

The plot centred on a colonel with a sick sister and a broken geyser. On a Sunday morning it so happened that the doctor attending the sick woman, the plumber called in to fix the geyser, and a suitor who came to ask the colonel for the hand of his daughter, were all named "Smith." The colonel mixed up the "Smiths," and his attempts to straighten out the tangle caused much amusement. The part of the colonel was played by Mr. Freddie MacDonald, who received excellent support from the other members of the cast.

The programme included the following items:—Mr. Harry Allen, recitation, "It's Grand" (encored); Miss R. Maude, vocal solos, "You're as Pretty as a Picture" and "Someone to Care for Me"; tap dance, Elva Richards, May Steward, and Joyce Nicholas. "The Bunk House" was a very popular item; a collection of cowboys and cowgirls were gathered round the camp-fire after the day's work, all joking together and joining in the singing, several solos and choruses being sung. Following this, Mr. Latham, dressed as a negro, sang "Old Kentucky Home" and "Old Black Joe," Mrs. L. Anderson, recitation "Lasca," and "Especially Jim." Comedy sketch by Mr. H. Allen and Mr. F. Dalgety, "Sambo and Sandy McPherson"; quartette, Misses R. Maude, D. Lauder, V. Plummer, and Mr. L. Anderson, "Little Dutch Kindergarten"; duet, Miss R. Maude and Mrs. L. Anderson, "Waltzing Matilda"; recitation, Miss L. Hynd; tap dance, Elva Richards and Joyce Nicholas.

The players in "The Old Geyser" were:—Mr. F. MacDonald (Colonel), Miss J. Hynds (Dorothy), Mr. P. Kirk (Suitor), Mr. D. Lauder (Doctor), Mr. H. Lauder (Plumber). There was also a short play, "Sunny Sunday," in which Miss R. Maude and Mrs. Lauder sang together "Sing a Song of Sunbeams." The last item was "Now is the Hour" sung by the company, after which everyone joined in the National Anthem.

Supper was served by the Young Farmers and helpers, after which the club president, Mr. F. Dalgety, thanked the audience for attending, the performers for their entertainment, and all who had in any way assisted to make the concert a success. The supper was followed by dancing.

Essay Competition

M. S. Moore, winner of a one guinea prize in the Christmas Y.F.C. Essay Competition is requested to send his full postal address to the Organising Secretary. On receipt of this a cheque will be forwarded to him.

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Methven Club's Field Day

R. INCH, District Secretary, Ashburton

A SUCCESSFUL field day was held recently by the Methven Young Farmers' Club in conjunction with the Methven Branch of the Farmers' Union. The party met in the township at 1 p.m., and first visited the property of Mr. J. T. Mangin and inspected a top-dressing trial laid down on an old pasture.

From here the members proceeded to the farm of Mr. C. A. Campion to inspect a wheat variety trial. Comparisons were made between the new crosses of wheat and the standard varieties growing alongside. A grass and clover strain trial on the same farm created great interest, demonstrating beyond doubt that the best pastures can be obtained only by sowing good seed; the superiority of the certified strains over ordinary commercial lines was readily apparent.

A welcome interlude was provided by Mrs. Campion, who entertained the visitors to afternoon tea.

A visit was then paid to Mr. J. Carr's farm, where an examination was made of a trial laid down to explore the possibilities of controlling yarr (spurrey) by liming. Lime and phosphates had been applied to a portion of a large paddock with very interesting results.

Mr. G. K. McPherson, Instructor in Agriculture, addressing the party on the benefits of topdressing.

[*R. Inch, photo.*

The last visit was to the property of Messrs. McLaughlan Bros. to inspect an observational topdressing trial. Mr. G. K. McPherson, Instructor in Agriculture, Ashburton, who conducted the party, explained the results obtained from the various trials, and impressed his audience with the necessity of using better methods in farming in order to obtain maximum production. Many questions were answered, and the field day concluded with a vote of thanks to Mr. McPherson for the information he had given, and to the farmers who had co-operated in the trials.

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P.O. Box 601, PALMERSTON N.

Obituary

F. R. Morrow

IT is with keen regret that the death is announced of Francis R. Morrow, son of Mr. and Mrs. F. D. Morrow, "Montalto," Mayfield, after a brief illness.

He was keenly interested in farming and farming organisations, and was honorary secretary of the Mayfield Young Farmers' Club and a very enthusiastic member. He was also a member of the committee of the Mayfield A. & P. Association, and at the time of his death was Vice-president. He was a keen sportsman with rod and gun.

The funeral, which left his residence, "Montalto," was conducted by the Rev. J. S. Freeman. Among the many wreaths were those from the Mayfield Young Farmers' Club, the Mayfield A. & P. Association, the Mayfield Presbyterian Church and the Mayfield Golf Club. The pall-bearers were Messrs. R. Morrow, R. Bayley, R. Bassett, N. Barker, W. S. Doyle (Y.F.C.) and S. R. Mulligan (Y.F.C.).

Young Farmers' Clubs in Great Britain

Farming periodicals recently received from England indicate that the Young Farmers' Clubs in Great Britain are carrying on as usual during the war. The Ministry of Agriculture has received offers from a number of clubs of their services during the war period.

Taihape Y.F.C. Dog Trials

R. O. BATLEY, Hon. Secretary, Taihape Club.

One of the events in the Taihape Club's dog trials.

THE Taihape Club held its first dog trial on the Moawhanga Collie Club grounds on Thursday, March 14. The success of the venture was so outstanding that an endeavour will be made to hold the event annually.

The majority of the twenty-five Young Farmers taking part had never competed in a dog trial before, and the work was of a very high standard. It is hoped that, now they have started, these members will be taking part in the regular dog trials in the near future. The activity drew a large attendance of interested spectators, who thoroughly enjoyed the trials.

At the conclusion S. Steedman, a club member, gave an interesting and instructive exhibition of hunting, heading and guarding with a team of three well trained dogs. Mr. F. R. Cottrell acted as judge, and complimented the Young Farmers on their keeness and good performances.

The following are the results:—

Class 1. Head and Ring (15 entries).—G. Siddele's "Fay," 1; P. Marshall's "Fly," 2; J. Davis's "Speed," 3; D. Wilkie's "Lil," 4.

Class 2. Huntaway (14 entries).—P. Marshall's "Bob," 1; L. McNeill's "Laddie," 2; R. Batley's "Walley," 3; S. Steedman's "Monk," 4.

Mr. C. Stewart's special prize of 10/- for two dogs (one heading and one huntaway) was won by P. Marshall's "Fly" and "Bob" with 72 points.

Among the Clubs: Reports on Activities

Western Southland.

Dipton.—Annual meeting. Officers elected: Advisory President, F. T. McRae; Club Chairman, D. Milligan; Secretary, G. V. Helm; Treasurer, M. English.

South Otago.

Clinton.—An interesting account of their recent visit to the Centennial Exhibition was given by Messrs. J. Mitchell and R. Roy.

Milton.—Annual meeting.

North Otago.

Enfield.—Discussion on tree-planting scheme. Mr. J. D. McLeod gave a talk entitled "The History of Land Tenure."

South Canterbury.

Milford.—Decided to take part in the Temuka and Geraldine A. and P. Association's Centennial Show. Several club members to act as class stewards. The club also intends forming part of the Pageant of Progress parade conducted by the association. The club is to co-operate with the Milford Advisory Committee in their arrangements for a Gala Day as a Centennial celebration.

Mid-Canterbury.

Mayfield.—Arrangements for public speaking contest for the "Barford Cup." Because of the death of the secretary, Mr. F. R. Morrow, an acting secretary (Mr. W. L. Doyle) was appointed for the remainder of the year.

Wairarapa.

Carterton.—Annual meeting. Officers elected and programme drawn up for the coming year.

Featherston.—Club field day held on Messrs. Jameson's and McMasters' properties, Tuhitarata. Judging competitions were held on Jersey cows and Romney sheep. Mr. H. McKenzie, Carterton, demonstrated on the Jersey cows, and Mr. Hoggard on the sheep. Mr. Armstrong, veterinarian, Masterton, lectured on "Sheep Diseases."

Martinborough.—Annual meeting. Election of officers.

Masterton.—Annual meeting. Officers elected: Advisory President, N. Blatchford; chairman, J. S. McKay; Secretary, H. S. Bannister; Treasurer, W. Cooper.

Manawatu.

Bunnythorpe.—A talk entitled "Topdressing" was given by Mr. A. J. Galpin, an advisory member of the club.

Colyton.—Discussions on Y.F.C. Centennial Games and 2ZA Y.F.C. radio competition.

Halcombe.—General business. Tug-of-war team chosen. At a previously unreported meeting Mr. K. Krammes, of the Superior Oil Company, spoke on "Geology in Relation to Oil Surveys."

Johnsonville.—Annual meeting. Officers elected: Advisory President, Mr. A. Horrobin; Club Chairman, C. Brown; Secretary, R. Rowell; Treasurer, P. Horrobin.

Levin.—Final arrangements for Centennial sports. Two new members elected. A talk by Mr. E. W. Barnett, Dominion President, on "The Air Force."

Opiki.—Annual meeting. Officers elected: Advisory President, Mr. R. M. Phillips; Club Chairman, C. Davy; Secretary, R. D. Vile; Treasurer, B. Olsen.

Oroua Downs.—Annual meeting. Officers elected: Advisory President, Mr. R. Craig; Club Chairman, S. Bayden; Secretary, W. G. Gates; Treasurer, M. Mills.

Rongotea.—Arrangements for club dance, proceeds of which to be donated to Patriotic Fund. Seven new members elected. Church parade held recently.

Shannon.—Annual meeting. Officers elected: Club Chairman, A. Couper; Secretary and Treasurer, J. T. Aitchison. At a previous meeting Mr. W. L. Bradfield gave a very instructive address on "Shelter Belts and Tree Planting."

Waituna.—Annual meeting. Officers elected: Advisory President, Mr. N. V. Shannon; Club Chairman, I. Old; Secretary and Treasurer, A. H. Sowebry. At a previous meeting arrangements were made to hold a field day. Impromptu talks given by club members.

Wanganui.

Taihape.—Discussion re Wellington Council's Centennial Sports Meeting. A dog trial to be held. A geological lecture was given by Messrs. W. Inby and J. Knight, of the Superior Oil Company, Taihape.

North Taranaki.

Cardiff.—New chairman elected. Decided to enter two teams in Y.F.C. stock judging at New Plymouth A. and P. Show. Mr. A. O'Sullivan, advisory president, addressed the meeting on how to produce baconer pigs. At a special meeting on December 11 Professor MacMichan, Massey College, exhibited his film taken on his tour of Europe and Argentine.

Hillsborough-Tarurutangi.—Teams entered for stock judging at New Plymouth A. and P. Show. Discussion relative to club broadcast. At a previous meeting the manager of the Maunder Fertiliser Works gave an interesting account of his recent trip to Nauru and Ocean Islands. He also spoke on "The Manufacture of Superphosphates."

Mangorei.—Arrangements for club debate. An interesting and instructive lecture was delivered by Mr. Wood, veterinary surgeon, on "Treatments for Diseases in Cattle."

Midhurst.—Teams selected to represent the club at the stock judging competitions at the New Plymouth Show. Decision to plant trees as a Centennial Memorial if land is available.

Rahotu.—Three teams chosen to compete in stock judging competitions at the New Plymouth Show. Arrangements for club dance. Impromptu speeches by club members.

Tikorangi.—Field day held at Mr. A. Alexander's piggeries. Mr. Alexander demonstrated how to judge a good baconer from a poor one.

Southern Hawke's Bay.

Ballance.—Annual meeting. Officers elected: Advisory President, Mr. A. Sinclair; Club Chairman, Mr. R. F. Day; Secretary, Mr. H. C. Wilton; Treasurer, Mr. M. Hercock.

Mangatainoka.—Decided to donate 5s to Patriotic Fund. Lecture on "First Aid" by Dr. Patterson.

Woodville.—Wellington Council sports programme discussed. Two new members elected. Mr. F. J. S. Holden, Department of Agriculture, gave an address on the sowing of permanent pastures, in which he dealt in particular with the method of preparing the ground and the kind and quality of seed to use.

Central Hawke's Bay.

Takapau.—Discussion on tree-planting scheme. Two short debates: (a) "Bailed Hay v. Stacked Hay"; speakers, G. White (for bailed hay) and R. Thomsen. Won by G. White. (b) "Round v. Oblong Grain Stacks"; speakers, E. McMillan and M. Hobsen. Result was a draw. At a previous meeting Mr. K. H. Mills displayed an interesting film on tractors.

Waipukurau.—Annual meeting. Officers elected: Advisory President, Mr. J. W. Harding; Club Chairman, N. Gibbons; Secretary, J. I. Mackie; Treasurer, G. E. Wilson. At a previous meeting arrangements were completed for a field day.

Poverty Bay.

Gisborne.—Mr. H. F. Robb gave a brief description of the State correspondence courses, dealing mainly with the farm accountancy courses. Impromptu speeches were given by the following members:—R. Nelson, M. D. Richardson, P. Livingston, I. Humphrey, B. Cowan, N. Tolerton, R. Field, R. Duncan, R. W. Smith, R. Pilmer. Mr. S. D. Briant adjudicated, and placed P. Livingston first.

Taumarunui.

Taumarunui.—General meeting. Arrangements for debate. A talk entitled "The Early History and Development of New Zealand" was given by Mr. F. Duncan.

Eastern Bay of Plenty.

Edgecumbe.—Arrangements to hold club dance to raise funds for the district committee. Lecture by Mr. I. Reebing, Supervisor for the Bay of Plenty District Pig Council, on "The Feeding and Management of Pigs During the Winter Months."

Western Bay of Plenty.

Pukehina.—General business. Five new members elected. Decided to prepare a paper on ragwort.

Te Puke.—General business. New member enrolled.

Rotorua.

Putaruru.—A new film on the latest methods of hay and ensilage making was presented by Mr. H. Woodyear-Smith. The film demonstrated the economy and labour-saving devices which have recently been introduced in this respect. A discussion on the film took place at the conclusion of the display.

Rotorua-Ngongataha.—General business. Discussion of Exhibition tour.

Auckland.

Clevedon.—Field day to be held. Discuscussion among members on "Manuring." At a previous meeting several club members spoke on various aspects of the recent Clevedon A. and P. Show—R. Ryburn (Jerseys), D. Ryburn (Friesians), J. McPherson (ponies and draughts), F. Aitchison (horses and hunters), V. Driver (Southdowns), R. Neeley (Ayrshires), G. Bell (fat stock), S. Bell (Romneys), and H. Driver (Shorthorns).

Franklin.—General business. Arrangements for social evening. Baconer competition discussed and entries received.

Harrisville.—Accepted entries for the forthcoming baconer competition. Mr. G. Gilmore addressed the meeting on "Farm Accountancy," illustrating his talk with books, papers, etc.

Mangatawhiri.—Entries received for baconer competition. Arrangements for club dance. At a previous meeting the club donated £5 to the Patriotic Fund.

Kaiatai.

Kaiatai.—Stewards appointed for the local A. and P. Show. Arrangements for club debate. A profit of £9 10s was disclosed as a result of holding two small dances recently. Decided to conduct these gatherings fortnightly.

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YOUR RAILWAYS FOR PROSPERITY

Health Notes for the Farm

Contributed by the Department of Health

A HUMAN LIFE MAY DEPEND ON *YOUR* KNOWLEDGE OF FIRST AID

"The times we live in, with their pathetic wealth of motor accidents, demand that a country side be scattered with men and women and boys and girls with proper knowledge of first aid, and with means at hand to carry the victims of this craze for for excitement and speed to the nearest hospital. During a tour which has now covered over 13,000 miles of land travel it has been my lot to listen to many instances of where terrible injuries have had to be endured, often ending fatally, because of the absence of any skilled "first-aider." I regret to say that in the majority of such instances the pain stricken victim was surrounded by sympathetic men and women of all walks of life entirely ignorant of even the most elementary principles of first aid, and consequently unable to do anything to staunch the flow of blood, or to bring relief to suffering. That is the pathos of things today, when almost everyone appears to take the line that the accident will happen to someone else, or, that a knowledge of first aid can be deferred until some great catastrophe happens."

—COLONEL SLEEMAN, Chief Commissioner of the St. John Ambulance Brigade Overseas.

THE inestimable value of a sound knowledge of first aid treatment to deal immediately with accidents that arise in the home and elsewhere is apparent daily. Medical and expert nursing assistance is not always readily available in the event of an accident, and in such instances a knowledge of what to do to prevent unnecessary suffering and possibly to save life is of great importance.

Parents should therefore ensure that their children take advantage of the widespread facilities available to obtain such knowledge as is offered through organisations which are actively engaged in this important sphere of health educational work. Boys and girls may also receive a grounding in elementary first aid by joining Boy Scouts, Girl Guides, or similar associations. Excellent elementary and advanced text books on first aid are readily obtainable at a small cost, and should have a place in every home, as well as a supply of first aid equipment, carefully labelled and kept in a cabinet made for the purpose.

Principles of First Aid

Now what are the essential principles of first aid? First aid has three objects—preservation of life, prevention of the aggravation of injury or condition, and provision of proper transport. And it teaches its students the art of improvising equipment when the need arises. No wonder that the trained "first aider" is treated with such respect, as illustrated in the following episode recounted in the "Life of Sir Robert Jones," the famous orthopaedic surgeon who did so much for crippled children throughout the world.

"In this age, in our cities, our industries, our isolated country homes, the necessity for a widespread diffusion of a sound knowledge of first aid treatment is a vital need. Knowledge of what to do in an emergency and putting that knowledge into practice may often save a life or prevent a life-long disability."

At the zenith of his fame Sir Robert was coming home one day when he saw a crowd at the scene of an accident. He found a man lying on the ground with a fractured leg. With borrowed walking sticks and handkerchiefs he was setting the limb when a man touched the policeman on the arm and said: "I have had first aid lessons."

"All right," replied the constable, and, turning to Sir Robert Jones, said, "Stand back, sir, please. Here is a first aid man." And so the man who knew as much about first aid treatment as any man in England graciously stood back to watch the completion of his work by the first aid man.

First aid is strictly limited in its scope, and has been neatly expressed by one authority by the initial letters of the word "MISHAPS." This is the more interesting, as the second half of the key-word, "HAPS," includes all the conditions for which active measures are required from "first aiders," and whereby lives may be and are saved by them. Let these essentials of first aid be now considered.

M MAIMS

A maim being defined as the loss of the use of an essential part of the body, this word provides us with a general term which includes fracture of bones, dislocations and sprains of joints. For none does first aid insist upon an exact diagnosis, and is content to treat the more serious injury.

I—IMPROVISATION

Further, improvisation enters largely into treatment and transport of

these conditions, and so first aid teaches its students how quickly articles of everyday use may be utilised as splints, bandages, and arm slings, and also how easy it is to manufacture a stretcher out of two poles and two coats or sacks, or a blanket with a couple of walking sticks as transverse bars. Lastly, first aid comes into action when medical aid is not available.

With a fracture, first aid lays down the need to control the broken limb on the spot with splints and bandages or with other means of restraint to avoid exposure of the part, except when the fracture is a compound one, proper use being made of "nature splints"—e.g., lower jaw bandaged to upper jaw, upper limb to trunk, and lower limb to its uninjured fellow. It teaches the selection of the most suitable method of transport, by hand-seat, stretcher, wheeled vehicle or ambulance. It stresses the importance of removing in recumbent position and by ambulance all cases of fracture of the skull, spine, pelvis and thigh.

With dislocations and sprains of joints, first aid teaches that there are two lines of treatment—outdoor and indoor. In the former emergency the injured joint is not to be exposed, but to be supported, proper use again being made of "nature's splints." In the latter, consequent on the swelling which quickly develops in injured joints, the limb has to be exposed carefully and supported on pillows while the joint is to be treated by continuous cold applications till the arrival of a doctor, whose services are invariably sought at the first possible moment in this and in all other emergencies.

With cases of insensibility, first aid teaches that to the untrained person this condition is apt to create panic, and that of all conditions it is the one in which active interference is to be deplored, exception being made only in the case of asphyxia. It requires that nothing should be given by mouth, that the patient should be treated mainly as for profound shock, and that he should invariably be removed to home or hospital, recumbent, and by ambulance or other wheeled vehicle.

S—SCALDS AND LOCAL INJURIES

This section includes various local injuries, scalds and burns, bites of animals, bruises, stings, foreign bodies and so on.

With scalds and burns, first aid emphasises the urgent need to cover the part quickly and so to protect the patient from the pressing danger of shock and sepsis. An application of a dressing made of clean linen or lint soaked in cod-liver oil and immediately applied will alleviate pain. Other oily substances, such as butter or carron oil, should not be used.

With slight bruises, it favours the continuous application of cold as a means of restricting further escape of blood from the torn vessels at the seat of injury.

With foreign bodies in the eye, ear, nose and stomach, first aid emphasises that in most instances active interference will do incalculable harm, and it urges its students to adopt a passive attitude except when the foreign body is in the mouth, throat or lungs and is obstructing the patient's breathing.

H—HAEMORRHAGE AND WOUNDS

It is noteworthy that scientific first aid established its reputation first by its successful preventive treatment of fractures and haemorrhages, both of which still occupy positions of importance in the examination for first aid certificates. With haemorrhage, therefore, first aid stresses the danger of severe and uncontrolled loss of blood, especially arterial, and by teaching its students the location of the main pressure points it shows how in most emergencies bleeding can be controlled. At the same time, it impresses on its students that with this condition it is almost as important to protect from shock and to keep the germs out as it is to keep the blood within the vessels of the body.

A—ASPHYXIA

Through the proper application of artificial respiration, first aid has saved many thousands of lives. First aid teaches ideal methods of resuscitation of apparently drowned, similar to those given in a previous article in this "Journal," and of suffocation arising from the stoppage of the windpipe by swallowing some object.

P—POISONING

Perhaps no emergency offers more serious difficulties to the medical practitioner as do some cases of poisoning by mouth. Fortunately for students, first aid simplifies both the diagnosis and treatment of this condition, as it directs prompt attention to the patient's mouth whether burned or otherwise, and so obtains a hint as to the poison taken (whether corrosive or non-corrosive) and its appropriate treatment.

If the mouth is burned no emetic is to be given lest further damage be done, but if it is not burned then an emetic is to be given at once and repeated until vomiting occurs. In all cases the doctor is to be summoned immediately and the antidote peculiar to the poison, if known, is to be administered without delay.

S—SHOCK

For all emergencies first aid seeks to impress on its students the urgent need to give prompt attention to the treatment of shock, which so often kills its victims. It therefore teaches that the cause must first be removed from the patient or the patient from the cause if possible; that the patient must be kept throughout in a recumbent position; that he must be wrapped up warmly in rugs or blankets to retain his own body heat, and, if practicable, be packed with properly protected hot water bottles; that except that he be unconscious, or, injury to an internal organ be suspected, he should be given hot drinks in sips, and lastly, if the shock be marked or slow in its reaction he must be removed to home or hospital recumbent and by ambulance. *It teaches, if practicable, that it is advisable to obtain the opinion of a medical man before a person suffering from shock is removed.*

In this age, in our cities, our industries, our isolated country home, the necessity for a widespread diffusion of a sound knowledge of first aid treatment is a vital need. Knowledge of what to do in an emergency and putting that knowledge into practice may often save a life or prevent a life-long disability. Towards this end parents would be well advised, as already stressed, to encourage their children to receive training in first aid from those organisations working in this great beneficial sphere of social service.

The Farm Home and Kitchen

Contributed by the Association for Country Education

Tasty Soups for the Winter

ON a cold winter's evening there is no dish which is more appreciated than a bowl of steaming hot soup. Children coming in from school love it; adults, cold and tired after a hard day's work, get as much pleasure from it. Moreover, soup stimulates the appetite, so that it is a good idea to start the meal with a bowl of soup, particularly if your appetite is flagging.

Fortunately, too, soup is an economical dish, and can be extremely nourishing. Admittedly, some soups merely act as appetisers, but others, such as vegetable soups and cream soups, may be classed as excellent foods.

Cream Soup

For instance, a cream soup is prepared by adding a vegetable pulp to a thin white sauce. The proportions are as follows:—1 tablespoon butter, 1 tablespoon flour, and 1 cup of milk for the white sauce, and to this add 1 cup of cooked vegetable which has been put through a sieve or colander. It doesn't matter in the least whether the vegetable has been a "left-over" or whether it has been cooked specially for the purpose. In any case, always stir while adding the vegetable pulp slowly to the sauce, having both hot, and do not combine them until immediately before serving. This minimises the danger of the soup curdling.

In the case of tomato soup, people sometimes add a pinch of baking soda to prevent the soup from curdling. This, however, is unwise, as the soda destroys the vitamins in the tomatoes and makes them practically useless for food value. How much wiser it is to prepare the soup carefully and avoid lazy short cuts.

Body-building Food

A cream soup made from milk and vegetables is an excellent body-building food. We all know that milk and vegetables are classified as protective foods, and also that milk builds healthy bodies, bones, and teeth, and hence everyone should have at least 1 pint per person per day. We often hear of children who object to drinking milk, but never have we heard of anyone who refused a cream soup if nicely made and well seasoned.

Then there are such a variety of vegetables which can be used in preparing this soup—sometimes it is brightly-coloured carrot or spinach, more often the potato or swede, sometimes the onion, other times a mixture of vegetables. It all depends on the season and which vegetable happens to be most plentiful in the garden.

Vegetable Soup

In preparing ordinary vegetable soup, meat or vegetable stock is often used as the foundation. This provides us with a way of using up the water in which the vegetables have been cooked; many people throw this stock away and thus lose much of the valuable mineral matter and vitamins. Surely it is foolish to pour the best part of the vegetable down the kitchen sink and use only what remains. The same people would not dream of pouring the stock in which a chicken had been cooked down the sink, yet the loss would be no greater. To make sure that you are able to use up most of the vegetable stock for soups, gravies, and sauces, it is a good idea not to cook the vegetables in too much water.

On the market we have various packaged soups which have value if made with milk or stock, the food value being largely that of the milk or stock. This seems to be a lazy and expensive way of making soup; how much better to use the vegetables which we can grow in our own garden. Besides, most people realise that it pays to have vegetables in the diet and that it pays to be healthy.

Balanced Diet

If we are not feeling fit we cannot hope to do our work properly or to enjoy life to the utmost. Moreover, good health is the foundation of a good appearance, and most people realise today that appearance does count.

A balanced diet including plenty of milk and vegetables is not the only factor in building a healthy body, but it is one of the essentials. When soup provides us with such an attractive way of including more milk and vegetables it seems that it might well play a larger part in the weekly menu. With the cold weather upon us, it should be a welcome addition.

Here are some recipes for tasty soups:—

ONION SOUP.

Onions, 6 (medium sized), butter or dripping, ¼ cup, vegetable broth, 1 pint, stale bread or toast, 3 slices, salt, 1 teaspoon, milk, 1 pint.

Method.—Cut up onions into a saucepan, having a tightly-fitting cover. Add the butter or dripping, and cover; seal with a damp cloth to prevent evaporation. Cook slowly for one hour. Remove cover and add the vegetable broth (left from cooking cauliflower or cabbage), stale bread or toast, salt

and pepper. Cover again and let cook for three-quarters of an hour. Remove from the fire when the onions and bread are well softened and press the whole through a collander. Add 1 pint of milk or enough to bring soup to the desired consistency. Heat again and serve with grated cheese, to be sprinkled over individual servings according to taste.

MULLIGATAWNY SOUP.

Stock, 3½ cups, tomato puree, ½ cup, onions, 1, carrots, 1, celery, 1 stick, apple, cloves, mace, and parsley, curry powder, 1½ tablespoons, flour, 3 tablespoons, butter, 1½ tablespoons, rice (cooked), ½ cup, salt and pepper.

Method.—Make stock with 1 lb. of shin of beef. Cook diced vegetables in butter until brown, add seasonings, flour, and curry powder mixed to a paste with a little cold water. Simmer one hour. Strain. Rub vegetables through a sieve. Mix all together. Reheat, and season. This makes a satisfying dish when served with boiled rice.

OYSTER SOUP.

Oysters, 2 dozen, oyster liquid, 1 cup, milk, 2 cups, flour, 2 tablespoons, salt and pepper, celery, 1 stick, mace, 1 blade, onion, 1 small, bacon, ½ rasher, parsley.

Method.—Drain the oysters from the liquor and beard them. To the beards and oyster liquor add 1 cup boiling water, salt, mace, chopped onion, parsley, bacon, and chopped celery. Let boil until the flavour is extracted. Make a white sauce, using the butter, flour, and milk. Drain off the stock and add it to the chopped oysters. Add this mixture to the white sauce. Reheat but do not boil. Season and serve.

CHEESE AND VEGETABLE SOUP.

Stock, 2 cups, carrots, 2 tablespoons finely chopped, onion, 1 tablespoon (chopped), mace, ¼ teaspoon, butter, 2 tablespoons, flour, 2 tablespoons, salt. 1½ teaspoons, salt, 1½ teaspoons, milk, 1 cup scalded, cheese, ¼ cup grated.

Method.—Brown the vegetable in half the fat. Add the stock, mace, and other seasonings, and cook until the vegetables are soft. Make a thin white sauce of the remaining ingredients, and add to the first mixture which has been forced through a puree sieve. Just before serving stir in the cheese and cook until it is melted.

FISH SOUP.

Fish, 2 lb. (approx.), butter, 1 oz., flour, 1 oz., onion, 1, milk, 1 pint, water, 1 pint, cloves and peppercorns, 2 or 3, salt and pepper.

Method.—Clean and scale the fish and remove the skin. (To remove the skin, put the fish flat on paper or board and make a cut just through the skin above the tail. Hold the tail firmly on the board and, with a cloth in the other hand, quickly tear off the skin up to the head.) Remove the flesh as when filleting and set aside in a cool place. Put head, skin, bones, etc., on to cook in the cold water; add onion, cloves, etc. Boil slowly about 1 hour. Strain, return the strained liquid to the saucepan, and add the fish. Cook slowly until fish is quite cooked, about 20 to 30 minutes. Work all through a soup strainer and return to saucepan. Add milk and seasoning and stir in the butter and flour mixed to a smooth paste. Stir until boiling. Serve with small dice of toasted or fried bread. Any kind of fish may be used—red cod, red schnapper, tarakihi, butterfish, etc.

CREAM OF VEGETABLE SOUP.

Fat (butter or dripping), 2 tablespoons, milk (or milk and vegetable broth), 2 cups, flour, 2 tablespoons, vegetable puree.

Method.—Make a white sauce, using fat, flour, and milk. To this white sauce add any vegetable puree. (Purees are made by cooking any vegetable until thoroughly done, seasoning with salt, pepper, and suitable herbs and forcing through a strainer. Carrots, swedes, potatoes, onions, celery, tomatoes, artichokes are all suitable).

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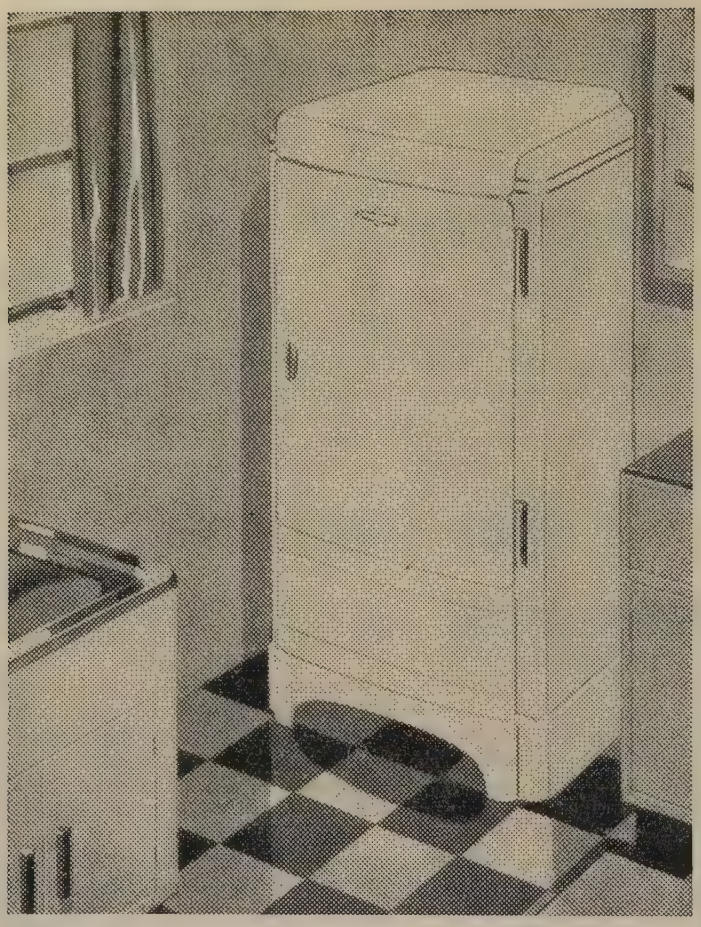

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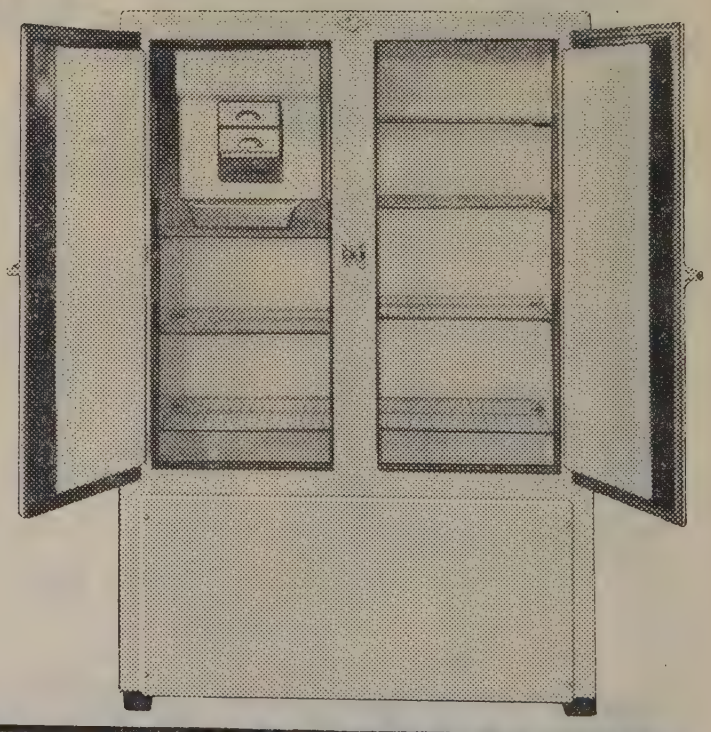

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LENTIL SOUP.

Lentils, 1 cup, cold water, 5 cups, milk, 2 cups, onion, ½, butter, 3 tablespoons, flour, 2 tablespoonfuls, salt, 1½ teaspoonfuls, pepper, ⅛ teaspoon, fat salt pork, 2in cube.

Method.—Wash lentils. Add the five cups of water. Add pork and onion. Simmer until tender and rub through a sieve. Make a sauce with the butter, flour, and milk, and add the puree to this. If necessary, dilute with additional milk, season, and serve piping hot.

TOMATO AND LIVER SOUP.

Fresh tomatoes, ½ lb., liver, ½ lb., onion, 1, stock or water, 1 pint, bunch of herbs, cornflour, 1 teaspoonful, celery, 1 stick.

Method.—Slice the tomatoes; peel, scald, and slice the onion; cut up the celery. Bring the stock to the boil, add the vegetables, and when boiling add the liver and seasonings. Simmer 30 minutes. Remove the liver and grate it. When the vegetables are tender, rub them through a wire sieve. Return to the pan, add the vinegar and liver, and if not thick enough blend the cornflour and stir it in. Boil five minutes after adding the cornflour. Serve hot.

APPLE CHUTNEY.

Apples, 4 lb., brown sugar, 1 lb., raisins, ½ lb., salt, 1 teaspoon, vinegar, 3 cups, onions, 2 (large), sultanas, ½ lb., preserved ginger, ¼ lb, mixed spice, ½ teaspoon.

If a hotter chutney is desired, add: Mustard, ½ oz., ground ginger, ½ oz., cayenne, 1 teaspoon.

AUTUMN CHUTNEY.

Apples, 3 lb., seedless raisins, 1 lb., tomatoes, 2 lbs., brown sugar, 1 lb., vinegar, 4 cups, cayenne, ½ teaspoon, pepper, 1 teaspoon, salt, 2 tablespoons, ground ginger, 2 tablespoons, onions, 1 lb.

Method.—Skin the tomatoes by pouring boiling water over them. Slice them into the pan. Mince apples and onions and add to the tomatoes together with the raisins, spice, and sugar. Stir and cook for 20 minutes. Add vinegar. Stir and boil 1½ to 2 hours until the chutney becomes thick. Taste, add more salt if required and pour it into clean, hot jars and cover at once.

GREEN TOMATO KETCHUP.

Green tomatoes, 3 lb., vinegar, ¾ cup, brown sugar, ¼ lb., allspice, ½ tablespoon, celery seed, ½ teaspoon, mustard seed, ½ teaspoon, black pepper, ½ teaspoon, cinnamon, ¼ teaspoon, onions, 2, salt, 1½ tablespoons, water, 1 cup.

Method.—Wash the tomatoes and cut them in quarters. Boil them with the water until soft; mash through a sieve and then add the onions; put through a mincer, add the remaining ingredients. Cook slowly until thick. Bottle in hot sterilised jars. Recipe makes about 2 pints.

GREEN TOMATO AND CELERY CHOW CHOW.

Green tomatoes, 4 lb., cauliflower, 1, onions (small), 8 oz., vinegar, 1 gallon, tumeric, 2 oz., cucumbers, 12 (small), celery, 2 bunches, French beans, 1½ lb., mustard seed, ¼ lb., allspice, pepper, clove, salt, ½ oz. each.

Method.—Prepare vegetables and cut in small pieces, cover with salt, let stand 24 hours and drain. Heat vinegar and spice to boiling point. Add vegetables and cook until soft. Bottle tightly in sterilised jars.

Pickle Recipes

Cucumber and Onion Pickle.

Use fresh green cucumbers and a few onions. Wash the cucumbers and peel and wash the onions. Cut the cucumbers and onions into coarse slices, crosswise. Prepare a light brine by dissolving ½lb. of salt in one gallon of water. Cover the cucumbers and the onions separately with this brine and let stand overnight and then drain thoroughly. Make a liquor of equal volumes of vinegar and water and use to scald the pickles about 10 minutes or until they are tender. Be careful not to get them too soft. Drain this liquor off thoroughly. Do not use it again. Dissolve 6lb. brown sugar in a mixture of 1 quart of water and 3 quarts vinegar. Then add the following spices:—1 tablespoon celery seed, 1 tablespoon mustard seed, and 1 tablespoon ground tumeric. Pack the drained pickles in glass-top jars. Bring the vinegar and spices to a boil and pour hot over the pickles and seal.

Pickled Onions.

- 4 quarts small white onions
- ¼ cup grated horse-radish
- 1 quart white vinegar
- ¼ cup sugar
- 3 tablespoons allspice
- 3 tablespoons white mustard seed
- 3 tablespoons peppercorns.

Method.—Drop fresh onions into hot water to loosen the outside skin. Cut off the dark portion from the root and slip off the skin, leaving the onion perfectly smooth. Cover the onions with boiling hot brine made by dissolving 1 cup of salt in 1½ quarts of boiling water. Soak the onions for 24 hours; then drain them. Soak them in fresh water for one hour and drain them again.

Mix the vinegar, sugar, and spices. Boil the mixture for one minute. Pack the onions into clean, sterile hot jars. Cover the pickles with boiling syrup, and seal the jars. Cool the jars quickly and store them in a cool place.

Pickled Beets.

Cook small beets until tender. Plunge them into cold water and slip off the skins. Cover the beets with spiced vinegar. Simmer the mixture for 15 minutes. Pack the beets into clean, sterile hot jars. Cover the beets with the boiling spiced vinegar, and partially seal the jars. Process the jars for 20 minutes in a boiling water bath; then complete the seal.

Sweet Gherkins.

- 2 quarts small green cucumbers, uniform size, 1-2 inches
- 2 quarts boiling vinegar
- 4 cups sugar (2lb.)
- 2 tablespoons whole allspice
- 1 tablespoon celery seed
- 2 tablespoons stick cinnamon
- 2 tablespoons whole cloves
- ½ cup white mustard seed.

Method.—If fresh cucumbers are used, cover them with boiling-hot water. Let the mixture stand for 24 hours; then drain. Save the vinegar and add the sugar and spices. Boil the mixture for five minutes. Pack the pickles into clean, sterile hot jars. Cover the cucumbers with the boiling syrup and seal the jars.

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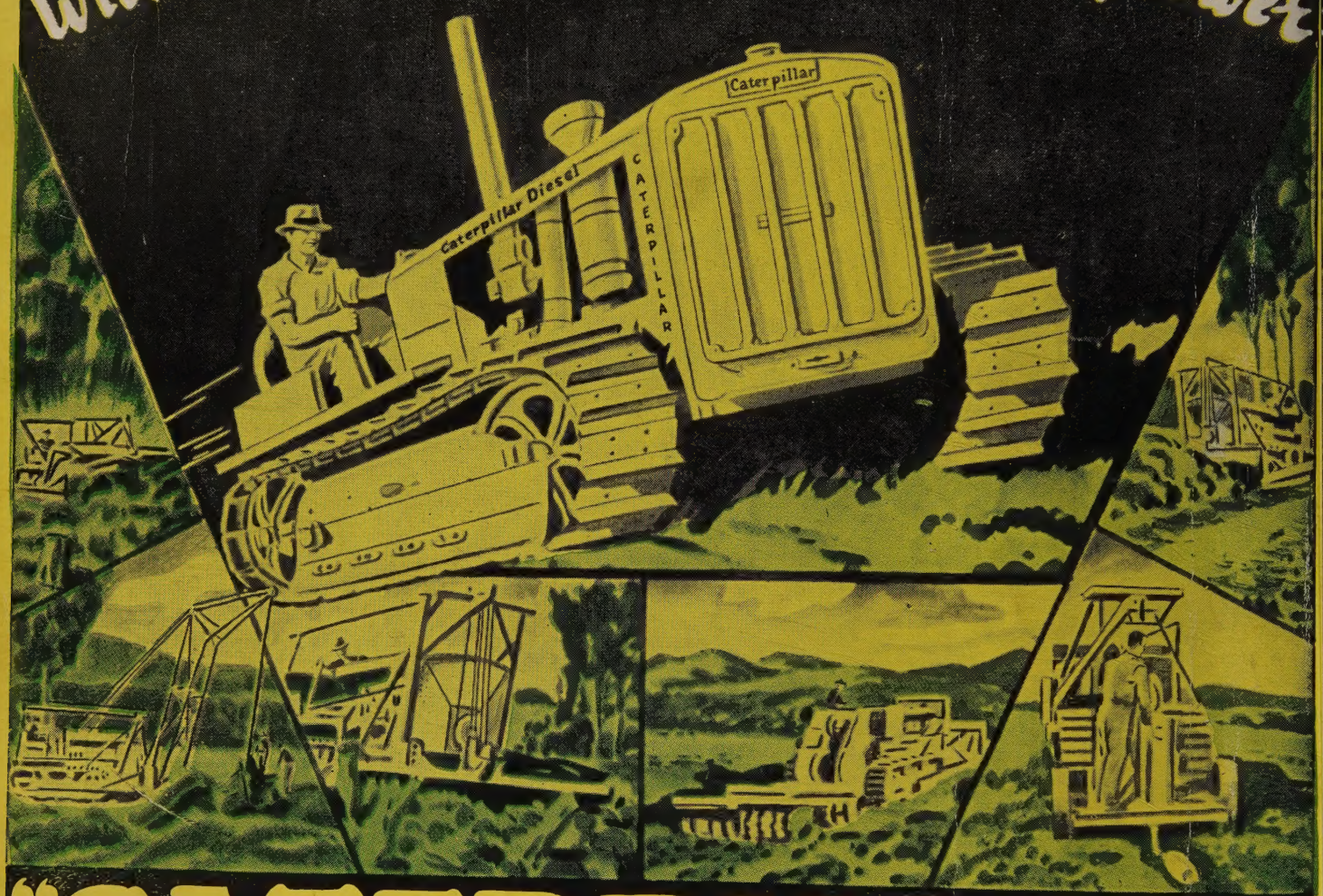

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